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HELMINTHOLOGICAL ABSTRACTS

A quarterly review of world literature on helminths and their vectors especially in relation to veterinary, medical and plant pathology, soil science, fisheries, fresh-water and marine zoology, taxonomy and geographical distribution.



Prepared by the

COMMONWEALTH BUREAU OF HELMINTHOLOGY

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The Bureau deals with the biology, systematics, diagnosis, pathology, treatment and control of helminths with special reference to forms parasitic in man and in domestic and wild animals, and to forms harmful to cultivated plants and related species occurring in soils or water. It also covers the biology of molluscan, arthropod and other vectors of helminth infections.

It scans the world literature for articles on helminthological subjects; abstracts those articles which appear to embody facts of importance in helminthology; and publishes the results of these activities in its quarterly journal.

From time to time the Bureau issues occasional publications of a non-periodical nature. These are of two kinds:

- (a) *Technical Communications* embody the results of recent advances in a manner useful to research workers.
- (b) *Digests*, a new series of publications, in which it is proposed to present information concerning recent advances in the application of research to the practical treatment and control of helminthic diseases of man, domestic animals, fish, and crop plants in a manner useful to the medical man, the public health worker, the veterinarian, the fishery officer, the farmer and the nurseryman.

A special function of the Bureau is the identification of helminthological material, particularly specimens sent by overseas workers to whom local facilities are not available. For this purpose it maintains a Taxonomic Unit. It provides laboratory and library facilities and technical help to scientists of the Commonwealth countries who wish to continue or complete their helminthological investigations while visiting the United Kingdom.

In approved cases the Bureau also prepares bibliographies on helminthological subjects; answers queries on helminthological problems; supplies microfilm and photostat copies of helminthological articles to those without access to the originals; and acts as a liaison centre for putting helminthologists working on similar problems in different parts of the world in touch with each other.

The Bureau does not undertake the preparation of translations from helminthological articles or books in foreign languages; but is prepared to make arrangements to get translations made at the expense of the inquirer.

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LIST OF PUBLICATIONS

(Obtainable from Commonwealth Agricultural Bureaux, Central Sales Branch, Farnham Royal, Bucks, England).

Helminthological Abstracts

Annual subscription, vol. 29, 1960 (including indices)	(\$7.70)	55s. 0d.
Single parts and annual indices	(\$1.90)	13s. 6d.
Back volumes 1 (1932) to 28 (1959) per volume	(\$7.70)	55s. 0d.

Subscribers (other than trade) resident in the British Commonwealth or the Republics of Sudan and Ireland are allowed a special discount of 20 per cent on annual subscriptions to current volumes provided they order direct from the Central Sales Branch at the above address.

Technical Communications

4. The Root-infesting Eelworms of the Genus <i>Heterodera</i> . Bibliography and Host-list. (1931)	(\$1.80)	12s. 0d.
15. The Bursate Lungworms of Domesticated Animals. T. W. M. Cameron. (1933)	(\$1.50)	10s. 0d.
16. Recent Researches on Helminth Immunity. Phyllis A. Clapham. (1933)	(\$0.90)	6s. 0d.
18. The Pathology and Aetiology of Plant Lesions caused by Parasitic Nematodes. T. Goodey. (1939)	(\$1.50)	10s. 0d.
23. Helminth Parasites of Australia. May R. Young. (1939)	(\$3.10)	20s. 6d.
26. Bibliography of Phenothiazine as an Anthelmintic. (1942)	(\$0.30)	2s. 0d.
29. The Cyst-forming Species of <i>Heterodera</i> . (1951). Mary T. Franklin. Illustrated cloth	(\$2.80)	18s. 6d.
30. The Nematode Parasites of Plants Catalogued Under their Hosts. T. Goodey, J. B. Goodey and Mary T. Franklin. 2nd edition revised (1956)	(\$4.20)	27s. 6d.
Supplement only. 1959.	(\$1.20)	7s. 6d.
31. Plants Recorded as Resistant to Root-Knot Nematodes (<i>Meloidogyne</i> spp.) Mary T. Franklin and D. J. Hooper	(\$1.20)	7s. 6d.

Ecology of the Free-living Stages of the Nematode Parasites of Sheep in relation to Flock Behaviour and Population Dynamics in Host and Parasite. H. D. Crofton.

Proprietary and Chemical Names of Anthelmintic Preparations. Sheila M. Willmott.

Pathogenesis of Helminthiasis. G. Lapage.

In preparation

In preparation

In preparation

Digests

Nematicides. J. Peachey.	In preparation
Veterinary Anthelmintic Medication. T. E. Gibson.	In preparation

EDITORIAL NOTICES

Reprints

The Editor would be glad to receive reprints of helminthological articles as soon as possible after their issue in order that abstracts of them may be printed without delay.

Reports

Departmental and other reports in which helminthological matters are mentioned should be sent to the Editor as soon as they are published in order that prompt notice of them may appear in *Helminthological Abstracts*.

Books for Review

The Editor will be glad to receive for review books relating to any branch of helminthology. Volumes in which helminthological subjects form only a part of a cognate whole are as welcome as those devoted exclusively to helminthology. Publishers are reminded of the world-wide circulation of *Helminthological Abstracts* among workers in this field.

News Items

Readers are invited to submit to the Editor items of news likely to be of interest to helminthologists.

PHOTOCOPIES AND MICROFILMS

In order to assist readers in obtaining copies of original articles or extracts therefrom which would otherwise be inaccessible to them, the Bureau offers the following services:

Photocopies

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(2) that the order includes a signed declaration that the photographic copy is required for the purpose of private study, research, criticism or review, and that the recipient undertakes not to sell or reproduce it.

An account will be rendered by the Bureau on completion of the work.

Special order forms may be obtained from the Bureau.

Since considerable time is often involved in obtaining the necessary journals when they are not available in the Bureau Library, some delay in the dispatch of photographic copies is often inevitable.

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TAXONOMY UNIT

In view of the need for taxonomic and identification services in helminthology, a Taxonomy Unit has now been established within the Bureau. The services provided include:

- (a) Assistance in the identification of helminthological specimens in co-operation with specialists in the United Kingdom and other countries.
- (b) Creation of reference collections available for exchange and distribution.
- (c) Encouragement and assistance in local surveys.
- (d) Provision of laboratory and library facilities and technical help to scientists of the Commonwealth countries who wish to continue or complete their helminthological investigations while visiting the United Kingdom.
- (e) The compilation of a modern authoritative work of reference.

Overseas workers to whom local facilities are not available are invited to submit their helminthological material for identification. Since badly fixed specimens are often unidentifiable, it is essential that all such specimens should be adequate in this respect. Advice on methods of fixation and preservation will be supplied on request.

ADVISORY SERVICE

The Bureau is always pleased to render an opinion or give assistance in connection with any helminthological matter submitted to it.

Recent Publications of the COMMONWEALTH BUREAU OF HELMINTHOLOGY

T. C. 30a. "Supplement to the Nematode Parasites of Plants Catalogued under their Hosts. 1955-1958"
by J. Basil Goodey, Ph.D., Mary T. Franklin, Ph.D. and David J. Hooper
66 pp. Price 7/6 (\$1.20)

T. C. 31. "Plants Recorded as Resistant to Root-Knot Nematodes
(*Meloidogyne* spp.)"
by Mary T. Franklin, Ph.D. and David J. Hooper
33 pp. Price 7/6 (\$1.20)

Orders for these publications can be placed with any major
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CENTRAL SALES BRANCH, FARNHAM ROYAL, BUCKS, ENGLAND

HELMINTHOLOGICAL ABSTRACTS

Vol. 29, Part 1

EDITORIAL

With the current issue *Helminthological Abstracts* appears in a new guise. The change in the cover is symbolic of the change within.

Increasing specialization within the field of helminthology has made it progressively more difficult in recent years for the reader to scan all relevant abstracts. This difficulty has been met by introducing a system of arrangement according to subject matter instead of according to journals. Cross references at the beginning of each sub-section direct attention to abstracts which, while dealing mainly with some other aspect, refer to the subject in question.

Each abstract now incorporates the whole reference to the original article and is therefore complete in itself. In response to numerous requests the address of the author, or of the senior author in the case of papers produced by a team, is now included wherever possible. Such addresses are given as printed in the article and are not necessarily complete from the postal point of view. In cases of difficulty, or where no address is given with the abstract, authors can usually be contacted by writing to them at the address of the editor or publisher of the relevant journal and marking the letter "Please forward".

The schedule of issue for *Helminthological Abstracts* is also being changed. Instead of collecting all the literature published in a given year into a corresponding volume, the Bureau will now issue four quarterly parts each year (in March, June, September and December) incorporating abstracts of papers as soon as possible after they are seen, regardless of the date of their publication. Volumes still outstanding under the old system are being completed as expeditiously as possible. The deadline for the changeover was 1st September 1959, all completed abstracts reaching the Editor's desk on or after that date being included in this and following parts. Inevitably a certain number of late abstracts published in 1957 and 1958 will be printed under the new system instead of in volumes 26 and 27 where they properly belong. The Editor regrets any inconvenience caused thereby.

Under the new scheme each part will be provided with author indices only. Complete author, subject and journal indices together with the title page for each volume will be issued in March of the following year.

Volume 28 represents a transition between the old system and the new. Part 1 contains abstracts of such literature published in 1959 as was received before September of that year; while remaining parts will contain titles (without abstracts) of all helminthological books and articles which came to the attention of the Bureau too late for inclusion in the relevant annual volume under the old scheme.

The period of metamorphosis is necessarily one of difficulty, since the production of volumes under the old system and the new is taking place concurrently. It is hoped, however, that by early in 1961 at the latest, the process will be complete.

Regular readers will notice a number of other changes in *Helminthological Abstracts*.

Each issue will contain either an Editorial or a Review Article. These Review Articles will be written by leading authorities in their respective fields. Reprints of them will be published and be purchasable separately. In this way it is hoped to bring the attention of helminthologists to recent developments not only in their own particular sphere of work but also in cognate branches of the subject.

Reviews of books, departmental and institutional reports and other non-periodical literature of helminthological import have always figured in *Helminthological Abstracts*. Now, however, each is to be segregated in its own particular section.

From time to time scientific films of helminthological interest are produced and a section is therefore being devoted to reviews of such films.

Another new section is being set aside for reports of meetings at which matters of interest to helminthologists have been discussed, or at which helminthological papers have been read. A broad view is necessarily taken in respect of general parasitological objects; and these will be included whenever, in the opinion of the Editor, they have a bearing upon helminthology. In certain cases it is possible for a member of the staff of the Bureau to attend such meetings and report them. In other cases the report is dependent upon information sent in by the authorities concerned or by someone outside the Bureau who has been present. The Editor will welcome any material submitted to him along these lines.

One of the functions of the Bureau is to assist helminthologists in establishing and maintaining contacts with other workers having similar interests or engaged upon similar problems. This is not always easy because helminthologists fall into five quite different groups, the members of which have often been trained in different disciplines, have different points of view and are sometimes unaware of the activities of those of other groups. The five groups are—the medical helminthologists, the veterinary helminthologists, the nematologists, the helminth taxonomists, and the workers in such general fields as helminth physiology and immunity. Since the Bureau is often the only point of contact between these five factions its function as a liaison office is of cardinal importance. In order that this function may be efficiently fulfilled two further departures have been made. On the one hand sections have been introduced dealing with news and with programmes and personnel. On the other hand it is proposed to compile a *Register of Helminthologists*.

Concerning news items and information about programmes and personnel of helminthological interest, co-operation from readers will be invaluable; and the Editor will appreciate any material submitted to him.

Concerning the *Register of Helminthologists*, readers are requested not only to fill in and return one of the forms enclosed with this issue but also to urge any non-readers who may be helminthologists to do likewise. Further copies of the forms may be obtained from the Bureau.

The policy of *Helminthological Abstracts* is to serve its readers as efficiently as possible by keeping them abreast of current research and acquainting them with all news and developments of helminthological interest. The changes at present being introduced have only been made after sounding helminthological opinion both within and without the Commonwealth. Now that suggestions have acquired reality the Editor will welcome comment, whether favourable or unfavourable.

The Editor wishes to take this opportunity of reminding readers that one of the functions of the Bureau is to act in an advisory capacity. Its wide circle of contacts with leading helminthologists in all parts of the world enable it to render an up-to-date and reliable opinion in connection with any helminthological problem. Every year an increasing number of queries is dealt with in this way.

BOOK REVIEWS

CHRISTIE, J. R., 1959. "Plant nematodes: their bionomics and control." **Gainesville, Fla: University of Florida**, xi+256 pp.

This book is a comprehensive work on plant nematology. The main sections of the book deal with symptoms of nematode injury to plants, control of nematodes and the characteristics of the chief parasitic genera. There is a bibliography at the end of each chapter and in the appendix there are tables giving the plant nematodes of some common crops, control measures for plant nematodes, hot-water treatments for controlling nematodes in planting stock and common and scientific names of nematodes.

H. R. Wallace

HUNGERFORD, T. G., 1959. "Diseases of livestock." **Sydney: Angus and Robertson**, 4th edition, 623 pp.

This text-book, which has been written with special reference to diseases of livestock occurring in Australia, devotes a chapter (pp. 395-454) to the diseases caused by parasites including endoparasites. Host-parasite check lists are included and the life-history, distribution, pathogenicity, treatment and control of the more important species are given in some detail.

F. H. S. Roberts

SHULTS, R. S., 1959. [Institut veterinarii Kazakhstogo filiala VASKHNIL.] [Helminthiases of sheep and cattle.] **Moscow: Selkhozgiz**, 240 pp. [In Russian.]

This handbook on helminthiases of sheep and cattle is intended for veterinary surgeons, zootechnicians and farm administrators. The contents are set out in sections dealing with: (i) the general structure and development of helminths; (ii) the harm done to the host; (iii) the principles of control, special attention being paid to good husbandry; and (iv) the diagnosis, pathology, immunity and control of the more important species. G. I. Pozniak

FILM REVIEWS

"Lungworm in Farm Animals". **Imperial Chemical Industries Ltd, Imperial Chemical House, Millbank, London, S.W.1.** Running time: 14 minutes. One reel. 35 mm.

This film gives an excellent account of the life-cycle of *Dictyocaulus viviparus* and its effect upon the host. Animated diagrams are used to demonstrate the migration of larvae from the ingested herbage through the mesenteric lymph nodes to the lungs and the passage of the eggs out in the faeces. The larvae and worms are filmed at each stage in their natural habitat. Pathological changes occurring in the infected lungs are illustrated by comparison with uninfected lungs. These changes are accompanied by sequences of calves at various stages of the infection to show the accompanying clinical features. The progressive reduction in the oxygenation of the blood is very well demonstrated by animated diagrams. Helmox is recommended for both prophylactic and curative treatment. Advice is also given as to the conditions under which calves are most likely to contract the disease and it is recommended that cattle are not allowed on pasture likely to be infected at times of high humidity or heavy dew.

K. Heath

SUMMARY OF REPORTS

JONES, F. G. W., 1959. [Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, U.K.] "Nematology Department." **Report. Rothamsted Experimental Station, Year 1958**, pp. 112-116.

The work of the department on migratory soil nematodes has been mainly concerned with population studies, extraction techniques and the successful culture of eight spear-bearing and twelve non-spear-bearing species of soil and plant nematodes. In respect of *Heterodera* spp., research has been done on the chemical nature of the hatching factor from potato roots; on the hatching of *H. göttingiana* in the laboratory; on the host specificity of *H. schachtii*; and on the influence of three years' continuous growing of cereal crops, of autumn and spring sowing and of the application of fertilizer on a population of *H. major*. The movement of eelworms in sand and of *Aphelencoides ritzema-bosi* on chrysanthemum have also been studied. Work continues on the observation of nematodes by time-lapse photography and on various types of culture and perfusion chambers in connection with life-cycle studies.

G. I. Pozniak

ABSTRACTS

When an address accompanies an abstract, it is that of the first author.

MEDICAL HELMINTHOLOGY

Surveys

1—CAMERON, T. W. M., 1957. [Macdonald College, McGill University, Quebec, Canada.] "Parasitology and the Arctic." **Transactions of the Royal Society of Canada.** Sect. V. Biological Sciences, **51**, 1-10.

Cameron, in a semi-popular article, discusses the helminth parasites of man in the Canadian Arctic, based on work carried out at the Institute of Parasitology, Macdonald College, during the past 25 years. *Trichinella* is common in the far north in man as well as in a large variety of other animals, the most important of which appear to be polar bears and walruses. Hydatid cyst is present to the extent of 40% in some tribes of Indians. While man is infected from dog faeces, the reservoir cycle is a deer-wolf one. The fish tapeworm is very common in man and dog but the main hosts are bears. Threadworms are common in man, hookworms and liver-flukes in dogs, and *Capillaria hepatica* in rodents.

G. A. Webster

2—CARLI, G. & MAMMINI, P., 1959. [Istituto d'Igiene "A. Di Veste" dell'Università di Pisa. Centro di Medicina Preventiva dell'Opera Universitaria, Pisa, Italy.] "Rilievi sulla incidenza delle parassitosi intestinali in un gruppo di studenti dell'Ateneo Pisano." **Rivista di Parassitologia**, **20** (2), 73-78. [English summary p. 78.]

Carli & Mammini found 20.8% of a group of 550 students at the University of Pisa to be infected with helminths. The most frequent species was *Trichuris trichiura* (17.8%), followed by *Ascaris lumbricoides* (2.5%), *Enterobius vermicularis* (1.6%), *Taenia saginata* (0.4%) and *Hymenolepis nana* (0.2%).

J. M. Watson

3—DOBBIN, Jr., J. E. & COELHO, M. DE V., 1958. [Centro de Pesquisas Aggeu Magalhães, Recife, Brazil.] "Parasitoses intestinais na Ilha de Fernando de Noronha." **Revista Brasileira de Malaria e Doenças Tropicais**, **10** (2), 127-131. [English summary p. 130.]

Dobbin & Coelho report on their investigation of human intestinal parasites on the island of Fernando de Noronha off the north-east coast of Brazil. Using the Scotch tape method for *Enterobius*, and Hoffmann's method for faecal examination, 729 swab specimens and 690 faecal specimens were examined. *Ascaris* was found in 75%, hookworm in 14.5%, *Enterobius* in 7.5%, *Schistosoma mansoni* in 7.2% and *Strongyloides stercoralis* in 2.2%. The majority of *Schistosoma mansoni* infections were in the 15-50 years age group. No local source of infection or local vectors were found. Over 66% of the total population was examined.

W. K. Dunscombe

4—FANTOVÁ, Z., 1957. [Krajská hygienicko-epidemiologická stanice, Prešov.] "Výsledky helminologického vyšetření několika dětských kolektívů v kraji prešov." **Československá Parasiologie**, **4**, 131-136. [English & Russian summaries pp. 135-136.]

Fantová examined 1,584 children one to fourteen years old in the Prešov district. The average incidence of infection with intestinal helminths was: *Trichuris trichiura* 37.2%, *Ascaris lumbricoides* 17.5%, *Enterobius vermicularis* 43.6%. In gipsy children the corresponding figures were 89.1%, 81% and 35.5%. *Trichostrongylus* and *Hymenolepis nana* infections were found in two single cases. Five out of 23 samples of dust from school environments contained eggs of *E. vermicularis*. Examination of 102 family members revealed the incidence of infection with *Trichuris* to be 26%, and with *Ascaris* to be 8.4%. Both these infections occurred together in 12% of these relatives. The incidence of helminth infection could be lowered therapeutically by 66%.

N. Jones

5—FRAGA DE AZEVEDO, J., COSTA FARO, M. M. DA, MORAIS, T. DE & ALMEIDA DIAS, J. DE, 1958. [Instituto de Medicina Tropical, Lisboa, Portugal.] "As parasitoses intestinais em Manica e Sofala (Moçambique)." *Anais do Instituto de Medicina Tropical. Lisbon*, 15 (4), 833-842. [English & French summaries pp. 840-842.]

In 1954, 2,056 faecal specimens, mainly from children under 15 years of age living in Mozambique, were examined fresh, stained by Lugol's iodine and by Willis' method. The highest incidence was for *Ancylostoma* spp., then *Ascaris*, *Trichuris*, *Strongyloides*, then *Enterobius*. *Hymenolepis diminuta* and *Fasciola hepatica* were detected for the first time in man in this area. Double or multiple infections were common. [There is no mention of schistosomiasis.]

W. K. Dunscombe

6—FERREIRA, A. P. & GÂNDARA, A. F., 1958. "Sobre a incidência das parasitoses intestinais na população juvenil da cidade de Macau." *Anais do Instituto de Medicina Tropical. Lisbon*, 15 (4), 909-916. [English & French summaries pp. 915-916.]

327 faecal specimens from individuals of both sexes, 3 to 20 years old, were examined direct and by concentration methods. *Trichuris* was found in 67, *Ascaris* in 63, *Enterobius* in 12, *Clonorchis sinensis* in seven, and *Fasciolidae* in five.

W. K. Dunscombe

7—FRAGA DE AZEVEDO, J., GÂNDARA, A. F. & FERREIRA, A. P., 1958. "Estudo sobre a incidência das parasitoses intestinais na Província de Timor." *Anais do Instituto de Medicina Tropical. Lisbon*, 15 (1), 71-87. [English & French summaries pp. 84-85.]

Faecal specimens from 776 persons, mostly of school age and from various areas of Portuguese Timor, were examined fresh and by Willis' method. It was found that infection with *Ascaris lumbricoides* ranged from 5% to 93.7% (average 24.4%), with hookworms from 2.5% to 70% (average 8.3%), with *Trichuris trichiura* from 1.5% to 50% (average 5.6%) and with *Enterobius vermicularis* from 1.5% to 30% (average 0.7%). [sic!] [A realistic value for the last-named infection would not be obtained by faecal examination.] A number had two or more infections. No *Paragonimus westermani* was found in ten patients who had haemoptyses but *Melania* spp. is wide-spread. Some increase in the incidence of helminths was noted with altitude.

W. K. Dunscombe

8—JÍROVEC, O. & ROSICKÝ, B., 1958. [Laboratorium für Protozoologie der Tschechoslowakischen Akademie der Wissenschaften und parasitologische Abteilung des Biologischen Instituts der Tschechoslowakischen Akademie der Wissenschaften, Prag.] "Erfolge und Perspektiven der humanen Parasitologie in der Tschechoslowakei." *Ceskoslovenská Parasitologie*, 5 (2), 15-25.

Jírovec & Rosický give a brief account of the results and perspectives of human parasitology in Czechoslovakia. They give the incidence of enterobiasis, trichuriasis, ascariasis, trichinelliasis and taeniasis according to different age groups. Strongyloidiasis and ancylostomiasis are considered to be without importance, although the latter infection was prevalent 50 years ago in the mining districts of north Bohemia and Slovakia.

N. Jones

9—LIE KIAN JOE & TAN KOK SIANG, 1959. [Department of Parasitology and General Pathology, School of Medicine, University of Indonesia, Djakarta.] "Human intestinal helminths obtained from autopsies in Djakarta, Indonesia." *American Journal of Tropical Medicine and Hygiene*, 8 (4), 518-523.

As a result of 664 post-mortem examinations in Djakarta, comprising 586 Indonesians, 69 Chinese and nine European residents of the city, Lie Kian Joe & Tan Kok Siang found the incidence of helminthiasis to be 98%. Hookworm was the commonest infection, occurring in 89.4% of Indonesians, 52.7% of Chinese and 30% of Europeans, with an average worm load of 63, 39 and 17 respectively. Incidence was similar in the two sexes, but men carried a heavier worm burden than women. *Necator americanus* was not only rather more than twice as prevalent as *Ancylostoma duodenale* but also showed a much heavier worm load. *A. ceylanicum* was found seven times and *A. caninum* once. *Trichuris trichiura* occurred in 86.9% of Indonesians and 70% of Chinese, with an average worm load of 13.3 and 7 respectively. The corresponding figures for *Ascaris lumbricoides* were 63.6% and 42% incidence, with average worm loads of 6 and 4. *Enterobius vermicularis* occurred in 39.4% of Indonesians, 36% of Chinese and four of the nine Europeans. *Strongyloides stercoralis* and *Trichostrongylus* spp. were also occasionally found. No trematodes or cestodes were recovered from this series of autopsies. J. M. Watson

Trematoda

See also Nos.: 152, 333, 334, 335, 336, 337, 338, 339, 342, 354, 384, 385, 408, 414.

10—ADAMS, A. R. D. & SEATON, D. R., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Carcinoma of the bladder following *Schistosoma haematobium* infection." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 5. Eggs of *Schistosoma haematobium* and *S. mansoni* were found in the urine of a West African Negro who had resided in Liverpool for over 20 years. There were malignant changes in the bladder and death had followed the development of a recto-vesical fistula. R. T. Leiper

11—BANCROFT, J. G., 1959. [Ibstock, Leicester.] "Human fascioliasis." [Correspondence.] **British Medical Journal**, Year 1959, 1 (5136), 1527. Bancroft has used pheniodol B.P. in doses of up to 9 gm. at a time for patients with *Clonorchis sinensis* infection in Korea, with only meagre results. He suggests, however, that this treatment might be more effective in human infections with *Fasciola hepatica*. J. M. Watson

12—CHUNG, H. L., HUANG, S. J., LI, T. H., HSÜ, H. C., HU, Y. M. & HSÜ, F. N., 1959. [Sino-Soviet Friendship Hospital, Peking.] "Studies on *Clonorchis sinensis* in Peking and Tsientsin. Occurrence of *Clonorchis sinensis* at Yungfeng Hsiang, Liulit'un of Ch'angp'ing District, Peking, with observations on intermediary and definitive hosts and detection of clinical cases by means of intradermal test with *Clonorchis* antigen." **Science Record. Peking**, New Series, 3 (10), 499-506. Following the discovery of numerous *Clonorchis sinensis* in a child from the area who died in Peking Children's Hospital, Yungfeng Hsiang, Liulit'un of Ch'angp'ing District, in the Peking area, was found to be a focus of endemic clonorchiasis. Eleven out of 421 children examined were found to be infected; and natural infection was found in 18 out of 36 cats and two out of 36 dogs in the area. The following fish from local ponds harboured *Clonorchis* cysts—*Pseudorasbora parva* (97.9%), *Acanthorhodeus taenianalis* (61.3%), *Pseudogobio rivularis* (36.6%), *Eleotris* sp. (19.6%), *Culter brevicauda* (17.7%) and *Carassius auratus* (2.7%). Individual fish carried from 13 to 77 cysts. *Bithynia fuchsiana* and *B. longicornis* occurred in the same ponds and collected specimens emitted lophocercous cercariae indistinguishable from those of *C. sinensis*. Heavily infected fish were fed to healthy cats from which mature specimens of *C. sinensis* were subsequently recovered. J. M. Watson

13—CLARKE, V. DE V., 1959. [Malaria and Bilharzia Research Laboratory, Salisbury, S. Rhodesia.] "Bilharzia in rural areas." **Rhodesian Tobacco**, Year 1959, No. 19, pp. 23-24. This is a popular account stressing the prevalence and importance of bilharziasis, the life-cycle of the parasites, methods of disrupting this cycle, precautions against infection and popular fallacies. J. M. Watson

14—FRAGA DE AZEVEDO, J., GÂNDARA, A. F., & FERREIRA, A. P., 1958. "Sobre a presença da bilharziose vesical não autoctone na Província de Timor." **Anais do Instituto de Medicina Tropical. Lisbon**, 15 (1), 259-262. [English & French summaries pp. 261-262.] 100 soldiers from Angola (where there is a high infection rate with *Schistosoma haematobium*) stationed in Timor, 252 local adults and 124 local schoolchildren were examined for *S. haematobium*. 12 of the soldiers were positive but none of the residents. However *Bulinus* was found close to several of the areas where the soldiers were stationed and there is a possibility of the infection becoming autochthonous. W. K. Dunscombe

15—GALYAMINA, V. D. & KASYANOVA, K. A., 1957. [*Opisthorchis* infection among the population of Kuybyshev.] [Abstract.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 740-741. [In Russian.] Three cases of *Opisthorchis felineus* infection are described from persons living in Kuybyshev and engaged in fishing on the Volga. G. I. Pozniak

16—GELFAND, M., ALVES, W. & WOODS, R. W., 1959. [Salisbury, Southern Rhodesia.] "The frequency of schistosomal oviposition in the heart." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **53** (3), 282-284.
 Gelfand *et al.* examined the hearts of 30 human subjects found to have vesical schistosomiasis due to *Schistosoma haematobium* alone or *S. haematobium* and *S. mansoni* concurrently, but found schistosome ova in none of them. They conclude that, though schistosomal myocarditis may occur, it is a rare clinical myopathy, and that the diagnosis cannot be established during life.
 J. M. Watson

17—GUIRGUIS, S. & EL-KATEB, H., 1959. "Bilharziasis of the adrenal glands." **Journal of Tropical Medicine and Hygiene**, **62** (5), 103-105.
 Guirguis & El-Kateb found only two cases of bilharziasis of the adrenal glands in 3,424 post-mortem examinations carried out over a period of 20 years, out of which 870 cases were bilharzial. No signs or symptoms of adrenal dysfunction had been present in either case, neither was there any cellular reaction around the ova. Serial sections of the adrenal glands from several cases of heavy bilharzial infection were examined, but neither ova nor granulation tissue was present. The authors consider that the most probable route of infection of the adrenals is by passage of worms or ova through porto-systemic venous anastomoses as emboli.
 J. M. Watson

18—ISHAK, K. G. & ABDEL MALIK, I. K., 1959. [Department of Pathology, U.S. Naval Medical Research Unit-3, Cairo, Egypt.] "Schistosomiasis of spleen with abscess formation and infarction." **American Journal of Tropical Medicine and Hygiene**, **8** (3), 319-323.
 Ishak & Abdel Malik report a case of splenic abscess with necrosis and separation of the upper pole. Histological examination showed, in addition to the acute inflammatory condition, ova of *Schistosoma haematobium* and of *S. mansoni*. These are believed to have reached the spleen as emboli.
 W. K. Dunscombe

19—JANZ, G. J. & CARVALHO, A. M. DE, 1957. [Missão de Prospecção de Endemias em Angola.] "Nota preliminar sobre a existência de bilharziose mansoni no Alto Zambeze (Angola)." **Anais do Instituto de Medicina Tropical. Lisbon**, **14** (3/4), 377-381. [English & French summaries pp. 380-381.]
 Out of 2,016 persons living in the upper Zambezi area of Angola, 1.1% were positive for *Schistosoma mansoni*. Indigenous molluscs were *Physopsis africanus*, *P. globosus*, *Bulinus tropicus* and *Lymnaea natalensis*. One *Biomphalaria* sp. was also found; *B. adowensis* is widely distributed in Angola. 4,100 persons living in other regions of Angola were all negative.
 W. K. Dunscombe

20—MAEGRAITH, B. G., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Some clinical cases and photographs: 2. Schistosomiasis mansoni in Egypt." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **53** (1), 2.
 Photographs [not reproduced] illustrated hepatosplenomegaly, peri-intestinal tumours and finger clubbing, without pulmonary involvement, in cases of schistosomiasis mansoni from Egypt.
 R. T. Leiper

21—MORAIS, T. DE, 1957. [Instituto de Investigação Médica de Moçambique.] "As bilharzioses humanas no distrito de Cabo Delgado (A.O.P.)." **Anais do Instituto de Medicina Tropical. Lisbon**, **14** (3/4), 455-460. [English & French summaries p. 460.]
 740 faecal specimens from children of both sexes aged between 3 and 16 years living in the Cabo Delgado region of Mozambique were examined for schistosomiasis. *Schistosoma haematobium* was found in 67.8% but no *S. mansoni* was detected.
 W. K. Dunscombe

22—MORAIS, T. DE, 1957. [Instituto de Investigação Médica de Moçambique.] "As bilharzioses humanas no distrito de Moçambique (A.O.P.)." **Anais do Instituto de Medicina Tropical. Lisbon**, **14** (3/4), 461-470. [English & French summaries pp. 469-470.]
 980 children of both sexes aged between 3 and 16 years living in various parts of Mozambique were examined for schistosomiasis. *Schistosoma haematobium* was found in 793 (80.9%) and *S. mansoni* in 63 (6.4%). *S. haematobium* is wide-spread but *S. mansoni* is restricted to local foci and does not occur at altitudes over 1,000 metres.
 W. K. Dunscombe

23—PELLEGRINO, J. & BRENER, Z., 1958. [Instituto Nacional de Endemias Rurais, Centro de Pesquisas de Belo Horizonte, Brazil.] "Estudo comparativo entre a reação intradérmica e o exame de fezes no diagnóstico da esquistosomose mansoni. II. Observações feitas em adultos." *Revista Brasileira de Malariologia e Doenças Tropicais*, 10 (3), 297-302. [English summary p. 302.] Continuing their investigations on the relative efficiency of stool examination and intradermal tests in the diagnosis of schistosomiasis mansoni, Pellegrino with his fellow-workers examined 558 men belonging to a battalion of Military Police at Belo Horizonte. Faecal examination was positive in 135 cases and the intradermal test positive in 299. Of those in whom the intradermal test was positive while the first faecal specimen was negative, 174 were re-examined and 149 found positive eventually, including 22 in whom the complement fixation test only was positive. It is considered that in adults, the intradermal test is more frequently positive than the faeces, so that both tests should be performed at the same time. W. K. Dunscombe

24—PELLEGRINO, J., BRENER, Z. & POMPEU MEMORIA, J. M., 1959. [Instituto Nacional de Endemias Rurais, Centro de Pesquisas de Belo Horizonte, Brazil.] "A comparative study of intradermal tests and stool examination in epidemiological surveys on schistosomiasis mansoni." *American Journal of Tropical Medicine and Hygiene*, 8 (3), 307-311. This is a repetition of the results reported in *Revista Brasileira de Malariologia e Doenças Tropicais*, 11 (3), 290-296 and 297-302. (See Nos. 23 and 25.) W. K. Dunscombe

25—PELLEGRINO, J., BRENER, Z. & SILVA, J. F. DA, 1958. [Instituto Nacional de Endemias Rurais, Centro de Pesquisas de Belo Horizonte, Brazil.] "Estudo comparativo entre a reação intradérmica e o exame de fezes no diagnóstico da esquistosomose mansoni. I. Observações feitas em crianças residentes em foco de alta endemicidade." *Revista Brasileira de Malariologia e Doenças Tropicais*, 10 (3), 290-296. [English summary pp. 295-296.] Pellegrino *et al.* investigated the relative efficiency of intradermal tests and faecal examination for the diagnosis of schistosomiasis mansoni. Their observations were made on 454 children aged 10 to 15 years, living in a hyperendemic area (Belo Horizonte) where there were many irrigation channels containing *Australorbis glabratus* infected with *Schistosoma mansoni*. Intradermal tests were made using antigens from either cercariae or adult *S. mansoni*. Wheals larger than 12 mm. were considered positive. A single faecal examination showed 298 (66%) to be infected, while 289 were positive with one or other of the intradermal tests. Repeating the faecal examinations up to eight to ten times raised the percentage of positives to 77%. It is suggested that the intradermal test and faecal examination should be complementary. W. K. Dunscombe

26—PITCHFORD, R. J., 1959. [Bilharzia Field Research Unit, Nelspruit, Transvaal.] "Natural schistosome infections in South African rodents." [Correspondence.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (2), 213. Eggs indistinguishable from those of *Schistosoma mansoni* have been found in wild-caught *Mastomys* sp. and *Otomys* sp., eggs indistinguishable from those of *S. haematobium* in *Otomys* sp., and eggs resembling those of *S. mattheei* in *Mastomys* sp. and *Tatera* sp. W. K. Dunscombe

27—RIDLEY, D. S., 1959. [Hospital for Tropical Diseases, London, N.W.1.] "Schistosomal complement-fixation test." [Correspondence.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (3), 298-300. Ridley discusses some of the difficulties which he has found in obtaining satisfactory antigens for the schistosomal complement fixation test. Antigens prepared in various ways and obtained from various sources were titrated against Fairley's original antigen obtained from livers of *Indoplanorbis exustus* naturally infected with *S. spindale*, which has been satisfactory despite its age. Pooled schistosomal sera were used as antibody and W.R. positive non-schistosomal sera as controls. The tabulated results show that comparable titres were obtained only with antigens from naturally infected snail livers and cercariae contaminated with snail faeces. J. M. Watson

28—SAÍNZ, P. A., 1957. "Sobre tres casos humanos de fascioliasis hepática con sintomatología infrecuente." *Revista Kuba de Medicina Tropical y Parasitología*, 13 (7/12), 67-70. Saínz lists and discusses the symptoms of the three principal forms of human fascioliasis, namely, the complete form, the benign form and the atypical form. Three cases falling within the last-named group are described in detail.

J. M. Watson

29—SCHOFIELD, F. D., 1959. [London School of Hygiene & Tropical Medicine, London.] "The schistosomal complement-fixation test. Part I. The diagnostic value." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (1), 64-70.

Schofield discusses the various factors which affect the evaluation of the complement fixation test in the diagnosis of human schistosomiasis, viz., the presence of other helminthic infections, the presence either of live or only dead eggs, the species of schistosome, the duration of the infection and the age and racial origin of the patients. Although C.F.T. is a good diagnostic test for recently acquired infections it becomes increasingly unreliable in those of more than three years' duration. It seemed probable that repeated reinfections were correlated with negative C.F.T. results.

R. T. Leiper

30—SCHOFIELD, F. D., 1959. [London School of Hygiene & Tropical Medicine, London.] "The schistosomal complement-fixation test. Part II. Value as a test of cure." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (1), 70-74.

The clinical value of the complement fixation test as a test of cure after treatment in schistosomiasis is discussed. Somewhat scanty evidence suggests that acquired immunity and absence of demonstrable C.F. antibody may be found together, especially in those areas where adult natives are exposed to repeated infection. Two possible explanations are submitted for the occurrence of a positive C.F.T. after a full course of treatment.

R. T. Leiper

31—STANDEN, O. D. & FULLER, K. A., 1959. [Wellcome Laboratories of Tropical Medicine, London.] "Ultra-violet irradiation of the cercariae of *Schistosoma mansoni*. Inhibition of development to the adult stage." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (5), 372-379.

Standen & Fuller exposed *Schistosoma mansoni* cercariae to ultra-violet radiation from mercury resonance lamps emitting more than 80% of their energy in the region of 2537 Å and having an output of 15 microwatts per sq. cm., measured at 1 cm. from source, and subsequently used some of them in experimental infection of mice. They found that (i) complete immobility was produced after four minutes irradiation at 2 cm. or five to ten minutes at 4 cm.; (ii) at a given distance from source, the proportion of irradiated cercariae which developed to the adult stage in mice varied inversely with the length of time of irradiation; (iii) complete inhibition of development was obtained after ten seconds irradiation at 2.5 cm. from source; (iv) cercarial penetration of mouse skin was unaffected by irradiation for the minimum periods necessary to inhibit development to the adult stage, failure in development occurring at a later phase in the life-cycle. With a higher powered lamp emitting 28 microwatts per sq. cm., operated under conditions similar to those obtaining in a standard bactericidal water sterilizer, cercarial development was completely inhibited after four to eight seconds exposure at 5.8 cm. from source. It is suggested that the inhibiting effects of ultra-violet irradiation on the subsequent development of schistosome cercariae provide a new approach to the protection of domestic water supplies by the use of a standard ultra-violet water sterilizer. J. M. Watson

32—STICKLEN, W. J., 1959. [Hartley, S. Rhodesia.] "Campaign against liver fluke and *Bilharzia* in Sokis Intensive Conservation Area." *Rhodesian Tobacco*, No. 19, pp. 24-25.

Sticklen emphasizes the economic importance of liver-fluke and bilharzia control in Rhodesia, and describes a pilot campaign which was carried out by spraying with copper sulphate in the Sokis Intensive Conservation Area which covers 280,000 acres and comprises four fifty-million gallon dams, 22 smaller dams and about 90 miles of streams. All dams, in which snail infestation was heaviest, were sprayed twice. Snails were again observed in the area in the following year but in negligible numbers compared with the original survey.

J. M. Watson

33—VAJRASTHIRA, S., HARINASUTA, C. & MAIPHOOM, C., 1959. [Communicable Diseases Control Division, Department of Health, Ministry of Public Health, Thailand.] "Study of helminthic infections in Thailand. 2. The incidence of paragonimiasis in the first recognized endemic area." *Japanese Journal of Experimental Medicine*, 29 (3), 159-166.

Vajrasthira *et al.* investigated the epidemiology of paragonimiasis in the Nong Mu District of Saraburi Province in Central Thailand, the first recognized endemic area of the infection in the country. 1.3% of the population were found to be infected, the majority of these being between 21 and 40 years of age and five out of eight being females. The houses of the infected persons were all close to streams suitable for fresh-water snails and crustaceans and were thus in a position both to contract and to spread the infection. Further investigation is necessary to incriminate the intermediate host species.

J. M. Watson

34—WARNER, B. W., 1957. [Department of Surgery, Lincoln Hospital, New York.] "Proctosigmoidoscopia y biopsia rectal en el diagnóstico de la schistosomiasis mansoni." *Revista Kuba de Medicina Tropical y Parasitología*, 13 (7/12), 71-72. [Translation of: *American Journal of Surgery*, 1956, 91, 130-132.]

[For abstract see Helm. Abs., 25, No. 606a.]

35—WILLEMIN-CLOG, L., POMMÉ, B., CALLOT, J., CHAPELO, R. & MONTRIEUL, B., 1957. "Aspect clinique et thérapeutique d'une radiculomyélite à *Schistosoma mansoni*." *Revue Neurologique*, 97 (6), 521-525.

Willemain-Clog *et al.* report a case of cerebrospinal infection with eggs of *Schistosoma mansoni*, confirmed histologically following exploratory laminectomy. The patient was a 12-year-old Moroccan boy. Subsequent treatment with cortancyl and anthiomaline relieved the more serious neurological symptoms.

J. M. Watson

36—YOKOGAWA, M. & OSHIMA, T., 1959. [Department of Parasitology, School of Medicine, Chiba University, Japan.] [Intradermal test for paragonimiasis. VI. Analysis of the antigenicity of the V.B.S. antigen with ammonium sulphate and cold methanol fractionation.] *Japanese Journal of Parasitology*, 8 (1), 44-49. [In Japanese: English summary p. 49.]

An active antigen for the intradermal reaction in paragonimiasis was precipitated by ammonium sulphate or cold methanol, the supernatant being left inactive. The degree of saturation of ammonium sulphate or the concentration of cold methanol did not affect the activity of the substance precipitated, indicating that it must be either a protein of low molecular weight or form a non-specific complex with protein.

M. Yoshida

Cestoda

See also Nos.: 363, 369, 393.

37—ADAMS, A. R. D. & SEATON, D. R., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Treatment of *Taenia saginata* infection with Dichlorophen." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (1), 5.

Twenty-six persons with *Taenia saginata* infection were treated with 6 gm. of Dichlorophen. Of these 19 were deemed cured after being under observation for four months. Whereas worms passed after meprazine treatment were intact the mature and gravid segments recovered after Dichlorophen treatment were broken.

R. T. Leiper

38—BUCK, S. C., PESTER, F. R. N. & BUCKLEY, J. J. C., 1959. [Department of Parasitology, London School of Hygiene & Tropical Medicine.] "'Tetrahyridium' from genet cat, Kenya." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (4), 304.

Buck *et al.* exhibited a larva of *Mesocestoides* sp., collected from the peritoneal cavity of a genet cat in Kenya. They comment on its close superficial resemblance to a "sparganum" larva from which it differs in possessing suckers situated within the invagination of the scolex and visible only in section.

J. M. Watson

39—BUCK, S. C., PESTER, F. R. N. & BUCKLEY, J. J. C., 1959. [Department of Parasitology, London School of Hygiene & Tropical Medicine.] "Sparganum" from man, Uganda." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (4), 303-304.

Buck *et al.* exhibited a plerocercoid larva of *Dibothriocephalus* sp., removed from a hernial sac of an adult male African in Uganda. J. M. Watson

40—CHIZHOVA, T. P., 1957. [Kafedra obshchei biologii I Moskovskogo ordena Lenina meditsinskogo instituta imeni I. M. Sechenova.] [The role of wild animals in the formation of foci of *Diphyllobothrium* infection.] *Meditsinskaya Parazitologiya i Parazitarnie Bolezni*. Moscow, 26 (6), 710-714. [In Russian.]

An investigation in 1940 into the focus of *Diphyllobothrium* infection on Lake Baykal showed 6% of the population to be infected with *D. minus* (in two morphological varieties) and *D. strictum*. The plerocercoids were found in 60% of salmonids, which were the only fish hosts. *D. latum* was absent. Another characteristic feature of this focus was the branchial infection of 50% of the fish with *D. dendriticum*. These worms, also occurring in two varieties, did not differ basically from *D. minus* (as shown in a comparative table of the measurements and morphological characters). The author therefore suggests that *D. minus* is a synonym of *D. dendriticum*, although experimental confirmation is required. As the high infection rate of the fish was not reflected in the human population, while infection in cats and dogs was infrequent, it is concluded that the focus is maintained by gulls and is a natural one.

G. I. Pozniak

41—COLLOMB, H. & BERT, J., 1957. "Distomatose cérébrale avec kystes parasitaires généralisés." *Revue Neurologique*, 97 (6), 501-506.

Collomb & Bert report a case of long-standing cerebral infection with *Heterophyes heterophyes* in a 32-year-old native of Morocco. Treatment with emetine followed by antihiomaline produced temporary improvement only. The apparently diverse clinical features were essentially of three types only, namely, neurological symptoms especially recurrent nervous crises, presence of subcutaneous and muscular nodules which biopsy revealed to contain eggs of the fluke, and variable abnormalities of the cerebrospinal fluid. J. M. Watson

42—DOBY, J. M., DOBY-DUBOIS, M. & DEBLOCK, S., 1957. [Laboratoire de Sciences Naturelles de la Faculté de Médecine et de Pharmacie de Rennes.] "Fréquence de la téniasis par *Taenia saginata* chez 3,000 enfants de la région de Yaoundé (Cameroun) détectée par la méthode de Graham." *Bulletin de la Société de Pathologie Exotique*, 50 (6), 929-936.

The contraction of gravid segments of *Taenia saginata*, the beef tapeworm, passing out of the anus, causes the deposition of eggs and these may be detected by Graham's method, employing adhesive cellophane tape and originally devised for the detection of *Enterobius* eggs. This method is more effective in detecting *T. saginata* than is examination of the faeces. 3,000 children of various races were examined and 0.06% proved to be infected. In this forest region the incidence is lower than in the cattle-raising areas of Africa. From their findings, Doby *et al.* discuss the influence of race, age and sex on incidence and conclude that the differences they find may be related to differences in dietary habits, which are determined by religion, money, preference for rare meat and methods of preparation of the meat. J. Mahon

43—FOSTER, F. H., 1958. "Hydatid disease in New Zealand." *New Zealand Medical Journal*, 57 (322), 562-571.

Foster states that on a population basis it is probable that hydatid disease is more common in New Zealand than it is in the people of any other country in the world. An analysis of cases admitted to public hospitals shows that there is an average of 87 new cases each year. The parasite is more common in Maoris than Europeans and in males than in females in all ages except for children under the age of ten. It is also more common in older patients in the liver; in younger patients the most favoured site of development is the lung. Readmission to hospital occurred in 30% of cases. People from small towns suffered from hydatid disease more frequently than those who lived in cities or country areas. There appears to have been no improvement in the mortality rate compared with 30 years ago. M. A. Gemmell

44—JOPLING, W. H. & WOODRUFF, A. W., 1959. [Hospital for Tropical Diseases, London, N.W.1.] "Treatment of tapeworm infections in man." **British Medical Journal**, Year 1959, 2 (5151), 542-544.

Jopling & Woodruff describe detailed observations on 240 patients treated for tapeworm infections at the Hospital for Tropical Diseases, London, during the past eight years. 238 of the patients were infected with *Taenia saginata*, one with *T. solium* and one with *Diphyllobothrium latum*. Six treatment regimes were employed, namely: (i) oral male fern in an emulsion without glycerin; (ii) oral male fern in an emulsion with glycerin; (iii) male fern by duodenal intubation; (iv) oral mepacrine; (v) mepacrine by duodenal intubation; (vi) oral mepacrine and male fern. No statistically significant difference in results was found between the six regimes. It is concluded that extract of male fern and mepacrine in the dosages used are of equal value as anthelmintics. Factors which may give rise to poor results when these regimes are used include inadequate preliminary fasting, administration of male fern in capsules instead of in a draught, and (when duodenal intubation is used) failure to take into account the volume needed to fill the tube before any is delivered from the distal end. Stress is laid on the importance of follow-up for at least four months in cases in which the scolex is not recovered after treatment. Failure of treatment due to vomiting was encountered more often among those treated with mepacrine than with male fern; hence treatment with mepacrine should be avoided in patients with *T. solium* infection in view of the risk of their contracting cysticerciasis.

J. M. Watson

45—KARASEVA, A. N., GULGAZOVA, M. F., SKVORTSOVA, V. G. & YAGUDINA, A. K., 1957. [Parazitologicheski otdel Astrakhanskoi oblastnoi sanitarno-epidemiologicheskoi stantsii.] [The epidemiology of *Diphyllobothrium* infection in the Astrakhan region.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 708-710. [In Russian.]

Diphyllobothrium disease is wide-spread among the population of the Astrakhan region. The over-all rate of infection has been 3.3% to 3.6% during the last six years, but in some areas it has reached 9.4% to 12.1% and even 25%. Therapeutic measures alone, applied for four years, lowered the rate of infection from 12.1% to 1.8% in a focus of three villages. The rate always rose in July and August following reinfection of the population in spring through eating raw pike roe.

G. I. Pozniak

46—KATZ, A. M. & PAN, C. T., 1958. "Echinococcus disease in the United States." **American Journal of Medicine**, 25 (5), 759-770.

Katz & Pan present a comprehensive review of hydatid disease in the United States. Since 1926, approximately 50 cases have been recorded each decade; since 1900, an average of six autochthonous cases each decade have been reported. Although the disease has been encountered in 39 states, native infections have occurred in only 14. The organ involvement of 541 cases is tabulated; the liver was the most commonly affected organ and in two-thirds of the cases the only site of infection. Diagnostic procedures are reviewed and the life-history and epidemiology of the parasite briefly discussed.

G. A. Webster

47—VASILKOVA, Z. G., 1957. [Institut malyarii, meditsinskoi parazitologii i gelmintologii Ministerstva zdravookhraneniya SSSR.] [The main aims of science in the control of *Diphyllobothrium* infection in the U.S.S.R.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 700-708. [In Russian.]

In Russia *Diphyllobothrium* infection is wide-spread among the population and recent foci have appeared. Vasilkova emphasizes the need for intensification of (i) research on the epidemiology of *Diphyllobothrium* in different types of focus, (ii) the search for new and more effective drugs to aid control and (iii) measures to prevent the development of new foci.

G. I. Pozniak

48—WEBSTER, G. A. & CAMERON, T. W. M., 1959. [Institute of Parasitology, Macdonald College, Quebec.] "On an unusual fish tapeworm from man." **Canadian Journal of Zoology**, 37 (2), 211-212.

Webster & Cameron describe a six-foot-long portion of *Dibothrioccephalus* sp., composed of mature segments only, recovered from an Indian boy in Saskatchewan. The segments were irregular, some elongated and some small and triangular. Elongated segments are already

recorded for *D. latus* and it is known that wide individual variation occurs within the genus. The irregular growth of the worm was probably caused by the physiological condition of the boy or the anthelmintic treatment he received. There are three references and one plate.

J. Mahon

49—YAMASHITA, J., OHBAYASHI, M. & KONNO, S., 1957. [Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo, Japan.] "Studies on echinococcosis. VI. Secondary echinococcosis multilocularis in mice." **Japanese Journal of Veterinary Research**, 5 (4), 197-202.

Yamashita *et al.* injected into mice, by the intraperitoneal and subcutaneous routes, material from *Echinococcus multilocularis* cysts obtained from a red-backed vole (*Clethrionomys rutilus*). The mice were sacrificed and examined within about four months. It was found that most injected scoleces showed a strong tendency to die in a comparatively early stage of development, but that occasionally some developed in the abdominal cavity into small masses having a histological structure similar to that of the adult cestode. These results are briefly compared with those of other workers who carried out similar experiments using material from unilocular cysts.

J. M. Watson

Acanthocephala

No relevant abstracts in this issue

Nematoda

See also Nos. 195, 326, 327, 328, 329, 330, 331, 347, 351, 352, 363, 375, 377, 378, 380, 386, 393, 402, 405, 409, 410, 422.

50—ADAMS, A. R. D. & SEATON, D. R., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Soda". A case of presumed *Onchocerca volvulus* infection from the Aden Protectorate." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 4.

Dermatitis of the leg and inguinal adenitis, reported by Fawdry (1957) in Arabs in southern Yemen, were seen by Adams & Seaton in an Arab from the Western Aden Protectorate who had resided in England for two years. The signs and symptoms disappeared after treatment with banocide and antrypol. The absence of *Onchocerca* microfilariae, in spite of prolonged search, is attributed to previous treatment with sodium antimony tartrate for a *Schistosoma mansoni* infection.

R. T. Leiper

51—ADAMS, A. R. D. & SEATON, D. R., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Unusual degree of eosinophilia associated with hookworm infection." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 5.

As a result of two treatments with tetrachlorethylene, a Jamaican Negro suffering from iron deficiency anaemia and a leucocytosis of 24,000, of which 90% were eosinophils, passed 873 *Necator americanus*, recovered from his anaemia and the leucocytosis fell to 9,000 of which 38% were eosinophils.

R. T. Leiper

52—ANDO, T., 1957. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [A study of *Gnathostoma spinigerum*.] **Igaku Kenkyu. Fukuoka**, 27 (10), 2342-2359. [In Japanese: English summary pp. 2358-2359.]

Ando has investigated the protein constituents of the body in both larval and adult *Gnathostoma spinigerum*. 14 amino-acids were detected, together with six free amino-acids and three fatty acids. It was considered possible that two of the fatty acids, namely, lactic and caproic acids, were responsible for the toxic action which the worms exert on the host. Cutaneous reaction was elicited in gnathostomiasis patients by extracts from any parts of the body of larval or adult worms, by any chemical fraction of the extract—protein, fat or sugar—by the culture media and even, though to a much lesser extent, by the extract of flesh of *Ophicephalus argus*. Of these, the protein fraction and the oesophagus extracts were found to be most effective.

M. Yoshida

53—ARTHUR, R. P. & SHELLEY, W. B., 1958. [Department of Dermatology, University of Pennsylvania School of Medicine, Penn., U.S.A.] "Larva currens. A distinctive variant of cutaneous larva migrans due to *Strongyloides stercoralis*." **Archives of Dermatology**, 78 (2), 186-190.

Arthur & Shelley describe in detail and illustrate a case of larva migrans due to intracutaneous infection with larvae of *Strongyloides stercoralis* which was cured by local injection of trypsin. The varieties and causes of cutaneous larva migrans are discussed and tabulated, and it is concluded that a differential diagnosis can be established in the present type on the clinical grounds of peri-anal topography, acute urticarial lesion, and extremely rapid advancement of the burrow. Proven cases invariably present evidence of chronic intestinal strongyloidiasis. The authors propose the name "larva currens" for this form of cutaneous strongyloidiasis.

J. M. Watson

54—ATÍAS, A., HERMOSILLA, M. & ALESSANDRINI, H., 1959. [Cátedra de Parasitología, Asesoría de Parasitología Clínica, Hospital San Juan de Dios, Chile.] "Ascaridiasis peritoneal. Descripción de tres casos." **Boletín Chileno de Parasitología**, 14 (1), 13-15. [English summary p. 13.]

Atías *et al.* discuss the clinical manifestations of peritonitis secondary to ascariasis in relation to three cases, which are described in detail. They comment that in a community where ascariasis is highly prevalent, a diagnosis of peritonitis of ascarid aetiology should be considered in all children suddenly presenting symptoms of intestinal occlusion following abdominal surgery.

J. M. Watson

55—BAYLET, R. J. & PAILLET, R. J., 1959. [Laboratoire de biologie des Forces Terrestres en A.O.F.] "Abscès musculaire par *Oesophagostomum* (Dakar)." **Bulletin de la Société de Pathologie Exotique**, 52 (1), 32-34.

Baylet & Paillet report from Dakar a case of infection with *Oesophagostomum stephanosiomum* in an African child from the Ivory Coast which presented as a painful superficial tumour of the right flank. Surgery revealed a suppurating abscess of the parietal muscles containing an adult female worm. It is not known how the infection was contracted.

J. M. Watson

56—BECK, J. W., SAAVEDRA, D., ANTELL, G. J. & TEJEIRO, B., 1959. [Department of Microbiology, University of Miami School of Medicine, Coral Gables, Florida, U.S.A.] "The treatment of pinworm infections in humans (enterobiasis) with pyrvinium chloride and pyrvinium pamoate." **American Journal of Tropical Medicine and Hygiene**, 8 (3), 349-352.

Beck *et al.* report on the treatment of enterobiasis by either the chloride or pamoate of pyrvinium. Both a multiple and a single dose schedule were tried for the pamoate, multiple only for the chloride. The multiple dose schedule for both drugs involved giving orally 2 mg. per kg. body-weight divided into three daily doses for seven consecutive days. The single dose schedule (pamoate) was 5 mg. per kg. body-weight. In the case of the chloride, of 63 children treated, all became negative by the ninth day and remained so. In the case of multiple dosage with pamoate all 34 children treated became negative by the seventh day and remained so, while 96 out of 100 children receiving a single dose became negative within seven days. The results indicated that both drugs could be 100% effective within two weeks. Animal experiments showed that the pamoate was only one quarter as toxic as the chloride, which was clinically not well received, although the pamoate was taken without difficulty. In view of the success of the single dose treatment it is suggested that in institutions regular treatment for threadworms by single doses of the pamoate should be carried out.

W. K. Dunscombe

57—BUDDEN, F. H., 1959. [Ophthalmic Unit, Kaduna, N. Nigeria.] "Onchocerciasis therapy." [Correspondence.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 118-119.

In 1,522 onchocerciasis patients treated with suramin the microfilariae disappeared from the anterior chamber and cornea, ocular inflammation ceased, the number of skin microfilariae fell dramatically and pruritus after initial exacerbation almost always stopped. Suramin also destroyed the adult worms, but the previously accepted dosage rate of the drug cannot be recommended owing to its severe and even fatal effects.

R. T. Leiper

58—CHOYCE, D. P., 1959. [9, Drake Road, Westcliff-on-Sea, Essex.] "Onchocerciasis and blindness." [Correspondence.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 119-120.

Choyce quotes three instances, from recent literature, which indicate that heavy infection with *Onchocerca volvulus* in an area is not necessarily accompanied by an increase in the incidence of blindness. In his opinion the problem of onchocerciasis and its relationship to blindness is much more complex than has hitherto been supposed and should be investigated by teams of experts consisting of a medical parasitologist, an ophthalmologist, a geneticist, a biochemist and an anthropologist.

R. T. Leiper

59—DOBBIN, Jr., J. E., COELHO, M. V. & CRUZ, A. E., 1958. [Centro de Pesquisas Aggeu Magalhães, Recife, Brazil.] "Filariose no Território de Fernando de Noronha." **Revista Brasileira de Malariologia e Doenças Tropicais**, 10 (2), 133-136. [English summary pp. 135-136.]

Dobbin *et al.* examined blood films from 809 persons on the island of Fernando de Noronha in September 1957 and found eight positive for *Wuchereria bancrofti*, all of whom were natives of Recife (an endemic area on the mainland coast). Pre-sausage forms were found in 15% of *Culex pipiens fatigans* caught in the houses of the eight infected persons; hence there is a possibility of the extension of the disease on the island. W. K. Dunscombe

60—FOY, H., KONDI, A. & AUSTIN, W. H., 1958. "Hookworms as a cause of tropical iron deficiency anaemia. Radio-active studies." **East African Medical Journal**, 35 (11), 607-615.

The faecal blood loss of a number of African patients with gross iron deficient anaemia was studied using the radio-isotopes of iron and chromium; these were injected intravenously as ferrated plasma or chromated cells and their presence later detected in the stools using a Geiger-Müller counter and a scintillation counter. In some of the patients anaemias were due to faecal blood loss; this was associated with the presence of over 1,000 hookworms. In the remainder no faecal blood loss was noted; these patients were infected with few or no hookworms. While it is difficult to distinguish between the two anaemias, both respond to iron therapy. Anthelmintic treatment alone will not cure due to the depleted iron reserves. In patients with giant stab cells in their marrow, folic acid should supplement iron therapy. The authors suggest that some dietary article should be supplemented with an iron salt as a prophylactic measure. In patients with 1,500 *Necator americanus*, daily blood losses averaged 12 ml. and iron losses 4.0 mg. G. M. Urquhart

61—FRAGA DE AZEVEDO, J., GÂNDARA, A. F. & FERREIRA, A. P., 1958. "Contribuição para o estudo da filariase na Província de Timor." **Anais do Instituto de Medicina Tropical. Lisbon**, 15 (1), 235-243. [English & French summaries pp. 242-243.]

3,350 persons of various ages living in 29 regions of Timor were examined for diurnal microfilariae and 66 in two of the regions for nocturnal microfilariae. In three of the regions the prevalence of elephantiasis was investigated. Eight out of 1,816 persons over seven years old were positive for diurnal microfilariae and five out of 66 over 18 years old positive for nocturnal microfilariae. 103 cases of elephantiasis were found out of an adult population of 3,352. Although *Wuchereria malayi* is the main cause of filariasis in Timor, the authors do not exclude a non-periodic form of *W. bancrofti*. Knott's concentration method is recommended for the examination of venous blood. W. K. Dunscombe

62—FRAGA DE AZEVEDO, J., GÂNDARA, A. F. & FERREIRA, A. P., 1958. "Ensaio terapêutica do fermento da *Carica papaya* na ascaridiose." **Anais do Instituto de Medicina Tropical. Lisbon**, 15 (1), 251-257. [English & French summaries pp. 256-257.]

23 persons of both sexes infected with *Ascaris*, and 18 who were also infected with hookworms, were given a product having *Carica papaya* as its base as follows: three doses of 2.25 gm. given on the same day without preparation, diet or laxative. The faeces were examined by Willis' method four to seven days and again 18-30 days after treatment. The drug was effective in 13 out of 23 *Ascaris* infections and in 4 out of 18 combined infections. The only side effect was slight abdominal pain in 10% of the patients. W. K. Dunscombe

63—FUSHIMI, J., 1959. [Department of Parasitology, Research Institute for Microbial Diseases, Osaka University, Japan.] [A consideration on the correlation between the so-called egg positive rate and the genuine infection rate, the rate of the unisexual parasitism or the mean number of the infected worms in the case of ascarid infection. 1. The examination of the fundamental materials for the construction of the theoretical model.] **Japanese Journal of Parasitology**, 8 (1), 108-114. [In Japanese: English summary p. 114.]

A theory to predict the real state of ascarid infection (including male worms) in a group of the population as a whole, from the so-called egg positive rate which could be measured by mass stool examination, was proposed, based on the assumption (a part of which was proved to be true), that the distribution of *Ascaris* eggs in faeces follows the Pólya-Eggenberger formula.

M. Yoshida

64—FUSHIMI, J., 1959. [Department of Parasitology, Research Institute for Microbial Diseases, Osaka University, Japan.] [A consideration on the correlation between the so-called egg positive rate and the genuine infection rate, the rate of the unisexual parasitism or the number of the infected worms in case of the ascarid infection. 2. The construction of the theoretical model.] **Japanese Journal of Parasitology**, 8 (2), 166-173. [In Japanese: English summary p. 173.]

[This is a mathematical paper which does not lend itself to abstraction.]

65—FUSHIMI, J. & NISHIMURA, T., 1959. [Department of Parasitology, Research Institute for Microbial Diseases, Osaka University, Japan.] [An example of the practical application of Fushimi's method, by which the quantitative estimation of the genuine infection rate and the infection density on ascariasis from the result of the ordinary faecal smear examination are enabled.] **Japanese Journal of Parasitology**, 8 (2), 179-188. [In Japanese: English summary pp. 187-188.]

Applicability of Fushimi's theory was proved by practical tests and it was suggested that the constant factors, d and h, were better indices than X (whole infection rate) and N (mean number of infecting worms = infection density) for the purpose of assessing the dynamic state of *Ascaris* infection.

M. Yoshida

66—GARNHAM, P. C. C. & LEWIS, D. J., 1959. [London School of Hygiene & Tropical Medicine, London.] "Parasites of British Honduras with special reference to leishmaniasis." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 12-35. [Discussion pp. 36-40.]

In British Honduras skin snips from 51 inhabitants were examined for *Onchocerca* infection but all proved negative, and no instance was found of larval infection in *Simulium metallicum* which is abundant in the Stann Creek Valley. Although their vectors were prevalent, *Wuchereria bancrofti* and *Mansonella ozzardi* were apparently absent. Two unidentified microfilariae were found in the toucan *Rhamphastos sulfuratus sulfuratus*. A mermithid in a *Simulium quadrivittatum* appeared to have destroyed its ovaries.

R. T. Leiper

67—HEISCH, R. B., NELSON, G. S. & FURLONG, M., 1959. [Division of Insect-Borne Diseases, Medical Research Laboratory, Kenya.] "Studies in filariasis in East Africa. 1. Filariasis on the Island of Pate, Kenya." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 41-53.

During these studies on filarial infections of man and animals on Pate Island off the Kenya coast, the incidence of *Wuchereria bancrofti* in 332 persons was 32% in the night blood and 4% in the day blood. At Faza, diethylcarbamazine at the dosage of 2.2 gm., spread over six days, was given to adults and 1.1 gm. to children; 1,200 out of a total population of 1,500 were treated. A fortnight later the human infection rate had fallen from 32% to 25% and the microfilarial density from 10.3% to 1.5%. Eight months later when the men only were re-examined their infection rate was 16% and their microfilarial density 1.1%. The commonest mosquitoes in houses in Faza were *Aedes pombaensis*, *A. aegypti* and *Culex pipiens fatigans*. The filarial infection rate in 15,000 mosquitoes dissected was 3% to 4% in *A. pombaensis* and 2% in *A. aegypti*. After the diethylcarbamazine campaign the infection rate in *C. p. fatigans* fell from 25% to 6.6% while that in the other species of mosquitoes remained unchanged. The caudal ends of the infective larvae in mosquitoes showed characteristic differences, which are figured. Those in 187 mosquitoes, found naturally infected, were proved to belong to *W. bancrofti* while those in *A. pombaensis* and *A. aegypti* were those of animal filariae.

R. T. Leiper

68—HIRAKI, K. & INOUE, M., 1959. [Department of Internal Medicine, Okayama University Medical School, Okayama, Japan.] "Studies on eosinophils in bone-marrow tissue culture of the human sternum. Part 1. Observations on the behaviors of eosinophils in bone-marrow tissue culture of the sternum in patients with various eosinophilia." *Acta Medicinae Okayama*, 13 (1), 57-64.

By performing sternal bone marrow tissue culture of normal persons and patients with hookworm disease or with bronchial asthma, Hiraki & Inoue found that in the two latter groups there was not only an increase in the number of eosinophil cells but also that they showed characteristic movement patterns specific to each disease and were readily recognizable.

J. M. Watson

69—HIRAKI, K. & INOUE, M., 1959. [Department of Internal Medicine, Okayama University Medical School, Okayama, Japan.] "Studies on eosinophils in bone-marrow tissue culture of the human sternum. Part 2. Study on the causative factor of eosinophilia in hookworm disease by means of bone-marrow tissue culture with a special reference to the relationship with allergic reaction." *Acta Medicinae Okayama*, 13 (1), 65-70.

With a view to determining the causative factor in hookworm eosinophilia, Hiraki & Inoue added the filtrate from an emulsion of fresh hookworms to bone marrow tissue cultures of normal and hookworm-infected persons. Their results led them to conclude that (i) allergic reaction to proteins or to metabolic products of the worms plays an important role in the causation of the eosinophilia, the hookworm patient being repeatedly sensitized by antigens present in the metabolic products or arising from the dead bodies of the worms; (ii) antibody production results, and the subsequent antigen-antibody reaction stimulates increase in mitosis and acceleration in the motility of the eosinophils in the bone marrow; and (iii) continuous discharge of eosinophils from the bone marrow parenchyma into the sinusoids follows, thereby inducing eosinophilia in the peripheral blood.

J. M. Watson

70—ISRAEL, M. S., 1959. [Department of Pathology, Royal College of Surgeons, London.] "The nodule in onchocerciasis." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (2), 142-147.

Histological comparison of *Onchocerca volvulus* nodules from 48 untreated patients and 22 treated with antrypol, showed no actual differences between treated and untreated persons. All contained a large proportion of disintegrating worms and some dead worms only, irrespective of treatment. It is suggested that the degeneration and death of the worm precipitates encapsulation, although trauma may be of importance in the actual sites of the nodules and possibly also the tendency of the African to keloid formation. Hence the nodule is not an essential part of the disease, but a witness to the presence of degenerating adult worms. Healthy worms lie freely in the subcutaneous tissue.

W. K. Dunscombe

71—JEZIORANSKA, A., 1958. [Pafistwowy zaklad higieny, zaklad parazytologii lek., Warszawa.] "Immunologische Reaktionen in der Diagnostik der Trichinellose auf Grund der Erfahrungen der Parasitologischen Abteilung des Staatlichen Instituts für Hygiene in Warszawa." *Cesko-slovenská Parasitologie*, 5 (2), 93-94.

Jeziorska carried out 770 serum tests on 500 patients with *Trichinella* infections. The antigens were obtained by digestion of muscles of rabbits and white rats experimentally infected with *Trichinella spiralis*. With the complement fixation reaction 70% to 90% of tests on the patients with three to nine-week-old infections were positive. 50% of two-year-old infections were positive. The ring test gave 70%-80% of positive results at the end of the third week after infection. Similar results were obtained with the micro-precipitation test and with live *T. spiralis* larvae tests in 222 cases. With the uro-precipitation test 61% of 135 cases were found positive within two weeks of infection. The number of positive reactions diminished after the third week and was negligible towards the end of the ninth week. Intracutaneous reaction with an antigen prepared after Witebsky, at concentrations of 1:5,000 to 1:10,000, used in 109 cases gave 72% to 100% positive results within 30-60 minutes at an early stage of infection. 72% positive results were obtained at a later stage of infection and 50% in one to two-year-old infections within 20-24 hours. As well as the saline extract of *T. spiralis* larvae the following antigen fractions were obtained: lipoid, polysaccharide, nucleoprotein and protein.

N. Jones

72—JORDAN, P., 1959. [East African Medical Survey & Research Institute, Mwanza, Tanganyika.] "A pilot scheme to eradicate bancroftian filariasis with diethylcarbamazine. Results of the first year's treatment." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 54-60.

This is an interim report on a pilot scheme to eradicate bancroftian filariasis in three areas on Ukara Island, in Lake Victoria Nyanza, by using diethylcarbamazine at monthly or two-monthly intervals to reduce the microfilarial count to zero. The results, so far, show that although the great majority of microfilariae were killed there remained a hard core which could develop normally in *Anopheles gambiae* and that a high mean microfilarial count requires a higher concentration of drug than a lower count. It is emphasized that the effectiveness of a scheme of control can only be fully assessed after several years.

R. T. Leiper

73—JORDAN, P., 1959. [East African Institute for Medical Research, Mwanza, Tanganyika.] "A note on the effect of a blood meal on infective larvae of *Wuchereria bancrofti* in *Culex fatigans*." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 148-150.

Laboratory-bred *Culex fatigans* fed twice on a volunteer who had *Wuchereria bancrofti* microfilariae in his night blood showed a higher incidence of infection when the total number of infective larvae in the mosquito was considered instead of larvae in the proboscis alone. This is likely to be of importance in filarial epidemiology, and should be taken into account when the number of infective mosquitoes is being determined.

W. K. Dunscombe

74—KERSHAW, W. E., JAMISON, D. G., MAEGRAITH, B. G., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Histopathology of onchocercal skin lesions." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 2.

A skin rash on the buttocks was the only clinical sign in a European with low intensity of *Onchocerca* infection. Skin biopsy showed little deformation in the skin structure and there was no relationship between the few round cells and the microfilariae. Banocide increased the itching for the first three days but six weeks later the rash had improved. Microfilariae, badly defined and surrounded by round cells, were difficult to find.

R. T. Leiper

75—KIRTHI SINGHA, H. S., 1959. [General Hospital, Colombo, Ceylon.] "Mesenteric adenitis in association with ascariasis." **British Medical Journal**, Year 1959, 2 (5146), 220-223.

Kirthi Singha describes five cases in four of which mesenteric adenitis was associated with hyperinfection with *Ascaris lumbricoides*; and notes that since his article was presented for publication, two further cases have been encountered. This association has not been previously reported in the literature. Presenting clinical features were generalized abdominal colic, nausea or vomiting, constipation, and pain maximal at an ill defined and variable point centering on the right iliac fossa. It is suggested that until a specific test is available for the detection of roundworm hyperinfection, laparotomy and appendicectomy followed by specific anthelmintic therapy represent the correct course of treatment.

J. M. Watson

76—KOJIMA, K. & KUMADA, M., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Survey on enterobiasis among schoolchildren and their families in Tokyo and the results of mass treatment.] **Japanese Journal of Parasitology**, 8 (2), 240-243. [In Japanese: English summary p. 243.]

Usui's method, a modification of the adhesive cellophane tape method, was shown to be capable of revealing 60-70% of persons harbouring pinworm ova on the first mass examination. A higher rate of infection was observed among those who had a member of the family infected. A 70% cure rate was produced by a six-day course of treatment with a piperazine preparation.

M. Yoshida

77—KOZAR, Z., KOLLOTO, B. & WARDA, L., 1958. [Institut für Meeres- und Tropenmedizin, Gdańsk, Poland.] "Studien über Trichinellose mittels des Intrakutanantestes." **Československá Parasitologie**, 5 (2), 111-113.

Kozar *et al.* used antigen prepared by the method of Witebsky, Wels and Heide, at a concentration of 1:10,000 in intradermal tests for trichinellosis. One group of 180 persons with symptoms was tested twice; another group of 99 persons with or without symptoms of trichinellosis was tested once. 88% of positive reactions were obtained in the case of six-month to

one-year-old infections, 72% with one to three-year-old infections and 62% with four to six-year-old infections. There were also positive reactions in the case of 20-year-old infections. 2,472 persons were tested in the Bialystok district with 37.94% positive reactions revealing trichinellosis. The incidence of infection, according to different age groups was as follows: 0-10 years 31.2%; 31-40 years 46.2%; over 71 years 22.9%. The incidence of infection differed from 2% to 100% in different communities. Bialystok district is divided into two parts by a river and vast swamps. In the southern part there is a high incidence of trichinellosis but in the northern part the incidence is much lower. N. Jones

78—LAING, A. B. G., 1959. [Institute for Medical Research, Kuala Lumpur, Malaya.] "The dusky leaf monkey (*Presbytis obscurus*) as a natural host of *Wuchereria malayi* in Malaya." [Correspondence.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 213-214.

Sheathed microfilariae, resembling those of *Wuchereria malayi*, were found in 17 out of 20 dusky leaf monkeys (*Presbytis obscurus*) and adult worms, indistinguishable from *W. malayi*, occurred in the lymphatic systems of 16. This suggests that a reservoir of *W. malayi* exists in a relatively common forest animal which may be of epidemiological importance. The author points out that the previous report [for abstract see Helm. Abs., 24, No. 3021] of *W. malayi*-like microfilariae from a banded leaf monkey (*P. melalophus*) is probably due to wrong species identification. W. K. Dunscombe

79—LANCASTER, L., 1959. "Mesenteric adenitis and ascariasis." [Correspondence.] **British Medical Journal**, Year 1959, 2 (5150), 501-502.

Lancaster mentions that, in several cases of appendicitis in which the appendix contained threadworms, sticky peritoneal exudate and enlargement of the mesenteric lymph nodes were found; these had been reported previously by Kirthi Singha in association with hyperinfection with *Ascaris lumbricoides*. [See abstract No. 75.] J. M. Watson

80—LEITNER, M. J. & GRYNKEWICH, S. E., 1958. [Gnaden Huetten Memorial Hospital, Lehighton, Pennsylvania, U.S.A.] "Encephalopathy associated with trichinosis treatment with ACTH and cortisone. Report of two cases." **American Journal of the Medical Sciences**, 236 (5), 546-550.

Leitner & Grynkewich report in detail two cases of trichinellosis presenting originally as stupor and delirium suggesting encephalitis of some type. Correct diagnosis was established by muscle biopsy from the right gastrocnemius. Rapid improvement of symptoms followed steroid therapy (100 mg. of Cortone t.d.s. in one case, 20 mg. of Meticorten t.d.s. in the other). The authors call attention to the difficulty of diagnosis in these cases, and suggest that trichinellosis should be considered in the differential diagnosis of obscure acute neurological disorders. J. M. Watson

81—MACFARLANE, L. R. S. & PENMAN, H. G., 1959. [Royal Army Medical College, Millbank, London, S.W.1.] "Some points in identifying microfilariae." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (4), 303.

By microscope and photomicrograph, Macfarlane & Penman illustrated some points of dissimilarity between microfilariae of *Loa loa*, *Acanthocheilonema streptocerca*, *Wuchereria bancrofti*, *Acanthocheilonema perstans* and *Onchocerca volvulus*. J. M. Watson

82—MACFARLANE, L. R. S. & PENMAN, H. G., 1959. [Royal Army Medical College, Millbank, London, S.W.1.] "Antrypol reactions in onchocerciasis." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (4), 303.

Macfarlane & Penman exhibited slides showing (i) a skin rash associated with antrypol treatment; (ii) a case of exfoliative dermatitis following antrypol treatment; and (iii) the effect of antrypol on adult *Onchocerca*. Brief comments refer to the effect of the drug on the microfilariae and on the skin and the possible reasons for the absence of microfilariae in the case of exfoliative dermatitis. J. M. Watson

83—MAEGRAITH, B. G., KERSHAW, W. E. & QUAYLE, I., 1959. [Liverpool School of Tropical Medicine, Liverpool.] "Onchocercal skin lesions in European woman." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 2.

Histological preparations from onchocercal skin lesions on the buttocks and thighs were demonstrated to illustrate the disappearance of microfilariae and tissue responses after treatment with hexazatin. R. T. Leiper

84—MELLO, A. L., FERRAZ, D. M. & RACHOU, R. G., 1958. [Departamento Nacional de Endemias Rurais, Circunscrição Rio Grande do Sul, Brazil.] "Resultado de inquéritos hemoscópicos para filariose humana realizados no Rio Grande do Sul no triénio 1954-1956." **Revista Brasileira de Malaria e Doenças Tropicais**, 10 (2), 211-212. [English summary p. 212.]

Investigation of the incidence of human filariasis in Rio Grande do Sul during a three-year survey from 1954-56 in 12 counties of the State, involved examining blood films from approximately 40,000 persons. Only 29 were positive for *Wuchereria bancrofti*. All were living in Pôrto Alegre [see also abstract No. 94]. W. K. Dunscombe

85—MOURA, L. S. DE, 1958. "Lesões oculares em doentes de oncocercose nas zonas de Catabola e Camacupa (Planalto do Bié, Angola)." **Anais do Instituto de Medicina Tropical. Lisbon**, 15 (2), 451-457. [English & French summaries pp. 456-457.]

Of 44 patients living in the Bié plateau of Angola who were proved positive for onchocerciasis by skin snip, 24 with ocular lesions probably due to the disease were examined clinically and by the ophthalmoscope (but not by slit lamp as no portable type was available). 15 of the patients were aged 30 to 50 years and nine were over 50 years of age. 12 had chorio-retinitis, eight complete or partial optic atrophy, nine cataract of variable extent or combined with glaucoma. Chorio-retinitis, cataract and changes at the limbus were typical. This is the first report of such ocular lesions due to onchocerciasis in Angola. W. K. Dunscombe

86—MUTAGUCHI, T. & KOMAKI, S., 1959. [Section of Health, Mitsui Miike Mining Company, Japan.] [Studies on the estimation of a geographical hookworm distribution by means of the number of hookworm discharged by mass treatment. 2. The number of hookworm discharged at varying intervals of time after administration.] **Japanese Journal of Parasitology**, 8 (2), 200-203. [In Japanese: English summary pp. 202-203.]

Finding that the number of hookworms expelled after administration of anthelmintics increased with time, Mutaguchi & Komaki emphasize the need to standardize the method of determining the geographical distribution of hookworm. M. Yoshida

87—MUTAGUCHI, Y. [T.] & NAKASHIMA, T., 1959. [Section of Health, Miike Mining Company, Japan.] [Studies on the estimation of a geographical hookworm distribution by means of the number of hookworm discharged by mass treatment. 1. Examination of hookworm at varying intervals of time after mass and hospital treatments.] **Japanese Journal of Parasitology**, 8 (2), 174-178. [In Japanese: English summary p. 178.]

The number of hookworms expelled 24 hours after administration of anthelmintics was found to be consistent enough to be used for estimating the geographical distribution of the worms. M. Yoshida

88—NAKAJIMA, C., 1959. [Department of Internal Medicine, School of Medicine, Chiba University, Japan.] [Studies on the distribution of *Ascaris* ova in human faeces.] **Japanese Journal of Parasitology**, 8 (1), 81-90. [In Japanese: English summary pp. 89-90.]

Nakajima studied the number of *Ascaris* eggs in six or twelve successive smear specimens from rural populations before and after mass treatment, and analysed the results statistically. It was confirmed that the mean number of eggs in human faeces shows exponential distribution in large population groups. Among other findings, the mean value of eggs in a population was shown to be a reliable measure to express not only the incidence of the parasite in the population but also the effectiveness of mass treatment. [For the remaining conclusions and mathematical procedures involved, which do not lend themselves to abstracting, this paper should be consulted in the original.] M. Yoshida

89—NAKAYAMA, K., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Studies on experimental *Ascaris* infection through respiratory tract. 4. Possibilities of developing *Ascaris* infection through the respiratory tract by the inhalation of aerosolized *Ascaris* eggs.] **Japanese Journal of Parasitology**, 8 (2), 160–165. [In Japanese: English summary p. 165.] It was found to be possible that ascarid eggs could be introduced by inhalation as far as the trachea through the respiratory system. However, this was considered to be of little significance parasitologically not only because of the rarity of this occurrence but also because of the unfavourable conditions in the respiratory tree for the eggs to develop. M. Yoshida

90—NISHIMURA, T., 1959. [Department of Parasitology, Research Institute for Microbial Diseases, Osaka University, Osaka, Japan.] [Studies on the tissue-invading habit of hookworm larvae under various temperatures. 2. Observations in soil with larvae of *Ancylostoma duodenale* and *A. caninum*.] **Japanese Journal of Parasitology**, 8 (2), 189–195. [In Japanese: English summary pp. 194–195.] By applying tubular pieces of rabbit intestine containing human serum, hookworm larvae in soil were found to be capable of penetrating tissue. The activity was highest from 24°C. to 30°C. (optimum 27°C.). In this connection it is noted that dermatitis among farmers in Osaka Prefecture is most frequent in September when temperatures are within the optimum temperature range. Differing from those in water, the larvae in soil did not regain activity at higher temperature ranges, i.e. about blood-heat. M. Yoshida

91—OKA, M., KADOWAKI, T., KAMEDA, Y., & YAMADA, S., 1959. [Department of Medical Zoology, Osaka City University, Medical School, Japan.] [Studies on the larval tropism and resistance of *Ancylostoma duodenale*.] **Japanese Journal of Parasitology**, 8 (1), 91–95. [In Japanese: English summary p. 95.] *Ancylostoma duodenale* was found to be positively chemotropic to human serum at 40°C., the activity decreasing at lower temperatures (no response at 15°C.). Digestive juice had no effect. In human digestive juice kept at 30°C., the hookworm larvae were found alive for 24 hours, the death rate increasing gradually from the third day of treatment. The effectiveness of sera from various animals for chemotropism decreased in the following sequence: cattle, guinea-pig, horse, mouse, rabbit and cat. M. Yoshida

92—OKADA, K., 1959. [Department of Clinical Research, Institute for Infectious Disease, University of Tokyo.] [Fundamental studies on the result of anthelmintic effect of *Ascaris*. 1. T.M. reaction.] **Japanese Journal of Parasitology**, 8 (1), 115–121. [In Japanese: English summary pp. 120–121.] The T.M. reaction, originated by Morishita, an immunological method of detecting *Ascaris* infection, using worm antigen and its rabbit antiserum, was found to be so consistent that the false negative results inevitable in stool examination were eliminated to a large extent. M. Yoshida

93—RACHOU, R. G., MATTA PIRES, W. & LIMA, M. M., 1958. [Departamento Nacional de Endemias Rurais, Rio de Janeiro, Brazil.] “Filariose bancroftiana em São Luiz, Maranhão: resultado de inquérito feito em 1957.” **Revista Brasileira de Malariologia e Doenças Tropicais**, 10 (1), 61–64. [English summary p. 64.] Bancroftian filariasis has been found in São Luiz, capital of Maranhão State. In 1951 it was considered that this form of filariasis did not exist in the town, but an investigation from May to September 1957 showed that out of 8,776 persons examined, 51 were carrying microfilariae of *Wuchereria bancrofti*. *Culex pipiens fatigans* was the only mosquito caught, and of 1,369 females dissected 112 had filarial larvae, eight of which were infective. Including this city, the number of endemic foci of bancroftian filariasis in Brazil is now eleven. W. K. Dunscombe

94—RACHOU, R. G., MELLO, A. L. & FERRAZ, D. M., 1958. [Departamento Nacional de Endemias Rurais, Centro de Pesquisas de Belo Horizonte, Brazil.] “Resultado de um inquérito de filariose humana em Pôrto Alegre (Rio Grande do Sul) realizado em 1953–1955.” **Revista Brasileira de Malariologia e Doenças Tropicais**, 10 (2), 207–210. [English summary p. 209.] Rachou *et al.* investigated human filariasis in Pôrto Alegre, the capital of the State of Rio Grande do Sul, where bancroftian filariasis is autochthonous. Between December 1953 and May 1954, and December 1954 and May 1955, blood films from 18,811 persons were examined

and 27 found positive for *Wuchereria bancrofti*. Practically all the mosquitoes caught were *Culex pipiens fatigans*. 12,490 were dissected. Three had pre-sausage forms and three sausage or first-stage larvae, but no infective forms were found. The meteorological conditions are not favourable for a high transmission rate, but the city is the southernmost focus of bancroftian filariasis in the world.

W. K. Dunscombe

95—RACHOU, R. G. & SCAFF, L. M., 1958. [Departamento Nacional de Endemias Rurais, Brazil.] “Redução da microfilaremia de *Wuchereria bancrofti* com hexazan em esquemas de tratamento de duração variável.” **Revista Brasileira de Malaria e Doenças Tropicais**, 10 (3), 303–326. [English summary pp. 325–326.]

Rachou & Scaff attempted the reduction of bancroftian filariasis by various schemes of dosage with diethylcarbamazine (hexazan). Four types of course of long duration and three of short duration were tried. The long courses were 6 mg. per kg. body-weight daily for 7, 10, 15, or 21 days; the short courses were 6 mg. per kg. daily for one or three days, and 12 mg. per kg. for one day. A total of 698 persons was treated by the long courses and 169 by the short courses. After 18 months' post-treatment observation the results did not vary greatly except that the number of those becoming negative increased with the greater duration of the course. In the short courses the results were practically the same. The authors conclude that a single dose of 6 mg. per kg. body-weight repeated in 6–12 months would be useful in a mass campaign.

W. K. Dunscombe

96—RICCI, M., 1959. [Istituto Superiore di Sanità, Laboratorio di Parassitologia, Rome.] “Sulla influenza dell'ambiente scolastico nella diffusione della ossiuriasi.” **Rivista di Parassitologia**, 20 (3), 153–164. [English summary pp. 163–164.]

Ricci investigated the variation in the incidence of threadworm infection throughout the school year in 24 elementary classes in three localities (Borgo Podgora, Borgo Piave and Borgo Sabotino), by making regular examinations with adhesive cellophane tape. He found that there was a general tendency for the percentage of infected children to increase from the beginning to the end of the school year, which was more marked in the lower classes than the higher ones. In one of the three localities the initial level of infection had been diminished by treating all infected children with piperazine adipate, but the effect of this was rapidly annulled and the level of infection reverted to that of the other two localities. He concludes that schools represent an element of great importance in the dissemination of enterobiasis, and that where similar general and social environments exist they tend to lead to a maximum level of infection which is uniform even in different localities. The paper is illustrated by three graphs and seven tables.

J. M. Watson

97—RODGER, F. C., 1959. [Muslim University, Aligarh, India.] “The movement of microfilariae of *Onchocerca volvulus* in the human eye from lid to retina.” **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 138–141.

Rodger made a study of ten eyeballs to show the method of entry of *Onchocerca volvulus* microfilariae. He suggests that the route followed is from the lids to the palpebral and bulbar conjunctivae, and that the sclera is a definite barrier. The mode of passage into the aqueous humour could not be determined. Penetration into the interior of the eyeball probably occurs at the sclero-corneal junction and then along the penetrating vessels. Retinal invasion was discovered for the first time, the parasites apparently forcing a passage through the pigment epithelium. The paper is illustrated by some excellent photomicrographs.

W. K. Dunscombe

98—RODGER, F. C., 1959. “Selected photographs of tropical eye diseases from Africa and India.” [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (4), 309.

Rodger exhibited *inter alia* a set of photomicrographs showing microfilariae of *Onchocerca volvulus* in every possible ocular structure, including the retina, and another set (at a similar magnification) of the five filarial embryos found in man in African onchocerciasis areas.

J. M. Watson

99—RODGER, F. C., 1959. "The dissolution of microfilariae of *Onchocerca volvulus* in the human eye and its effect on the tissues." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, **53** (5), 400–403.

Rodger describes the microscopic changes following the death of microfilariae of *Onchocerca volvulus* in the eye, as seen in sections stained with haematoxylin and eosin, and phloxine tartrazine. Four distinct stages are differentiated. The living parasite apparently induces no tissue reaction but, after death, eosinophils, lymphocytes, plasma cells and fibroblasts appear in the vicinity of the disintegrating body, roughly in that order and relative proportion. New capillaries grow towards the focus. When dissolution is complete the proportionate representation of these cells is reversed. At no stage in the process are polyblasts or giant cells seen. That, after the visible processes of dissolution are complete, toxins in solution may remain to diffuse slowly into and affect neighbouring tissues and structures, is indicated by a diffuse basophil staining of the tissues in which the characteristic inflammatory cells lie.

J. M. Watson

100—ROY, S. K., CHATTERJEE, D. N., BHATTACHARJEE, S. & DUTT, A., 1957. "Treatment of ascariasis in children with piperazine adipate and thiocarbanilate." **Journal of the Indian Medical Association**, **29** (7), 277–280.

A combination of piperazine adipate and a thiocarbanilate (1491E) was given to 110 Indian children with ascariasis. The drug was given as tablets, each containing 400 mg. piperazine adipate and 125 mg. of thiocarbanilate. All children up to two years were given two tablets on one day, either as single or divided doses, and children of two to ten years were given four tablets in one day either as single or four divided doses. Dosage was repeated in cases still positive after initial or subsequent treatments. Of 32 in-patients, four patients who received a single dose were cleared; of 20 patients receiving divided doses, 19 were cleared after the first course and all were cleared after the third course; of eight patients who received the total dose in 12 divided doses over three days, five were cured after the first course and a further two after the second. Of 40 recorded out-patients given similar dosages the cure rate was 6 out of 8, 16 out of 20, and 9 out of 12 in the first course, respectively. Some patients received two courses and others three courses. No toxic side effects were observed. The authors state that the combination of piperazine adipate and thiocarbanilate has some special advantage over the adipate alone. [This assertion is not strictly tenable since comparative tests were not carried out.]

O. D. Standen

101—SAIF, M., 1957. "On the single-dose treatment of ascariasis with piperazine citrate." **Journal of the Egyptian Medical Association**, **40** (8), 557–560.

Piperazine citrate was administrated as tablets or syrup to 86 patients with ascariasis in single daily doses of 3 or 4 gm. for one, two or four days. [All dosage expressed in terms of piperazine hexahydrate.] One week after treatment the stools were examined for *Ascaris* ova on three occasions by the M.I.F.C. method. Three negative examinations were considered to indicate a cure. Of ten patients given 3 gm. daily for four days, all were cured; of 34 patients given 3 gm. on one occasion only, 32 were cured. The size of the treatment groups varied considerably, having a range of four to 34 but medication with the syrup preparation appeared to have a marginal superiority in efficiency over the tablet and was easier in administration. Single dose treatment with 3 gm. equivalent of piperazine hexahydrate as citrate was considered suitable for mass administration since no side effects were observed at this or higher dose levels.

O. D. Standen

102—SAMS, W. M. & BECK, J. W., 1959. [University of Miami School of Medicine, Department of Medicine, Florida, U.S.A.] "Subcutaneous filarial infections. A report of two additional cases from Florida." **Archives of Dermatology**, **79** (3), 294–297. [Discussion pp. 297–298.]

Sams & Beck report two additional cases of human infection with *Dirofilaria conjunctivae*, which brings to five the total number of cases reported from the U.S.A., all from Florida. Both the patients were middle-aged women, in one of whom the parasite was migratory in the facial region while in the other it was found in the left breast.

J. M. Watson

103—SHISHIME, T., 1959. [Department of Internal Medicine, School of Medicine, Okayama University, Japan.] [The connection between *Ancylostoma* carriers and the outbreak of diseases.] **Japanese Journal of Parasitology**, 8 (2), 244-252. [In Japanese: English summary p. 252.] An extensive survey failed to reveal a clear correlation between *Ancylostoma* infection and the occurrence of a wide variety of diseases; but there was an indication that a higher rate of infection occurred in patients suffering from asthma, dyspepsia and influenza. M. Yoshida

104—SIPAHIOĞLU, H., 1959. [Health Centre of the Alanya, Turkey.] "Filariasis in Turkey." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 151-153. Investigation in Alanya (a Turkish port on the Mediterranean) of 312 persons showed microfilariae, probably *Wuchereria bancrofti*, in 32. Some had no symptoms but others showed evidence of filariasis, three having early elephantiasis of the scrotum. 30 were treated by tetrazan at a dose rate of 2 mg. per kg. body-weight [results not stated]. Neither the vector nor the extent of the disease in the country has been determined as yet. As for Alanya itself the disease may have been imported from perhaps Egypt or Syria. W. K. Dunscombe

105—SUZUKI, N., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Epidemiological studies on hookworm in a village of Tokyo Prefecture.] **Japanese Journal of Parasitology**, 8 (1), 50-56. [In Japanese: English summary p. 56.] Infection with hookworm, the rate of which was 9.8% in a village near Tokyo (*Necator americanus* was the dominant species), was related to the frequency and the kind of outdoor activities. Infection was high in spring and summer, low in winter. M. Yoshida

106—SUZUKI, N., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Epidemiological studies on hookworm in a village of Saitama Prefecture.] **Japanese Journal of Parasitology**, 8 (2), 223-231. [In Japanese: English summary p. 231.] The rate of hookworm (chiefly *Necator americanus*) infection in a farming village was found to be related to the larval density in the field as well as to the frequency with which the people happened to enter the fields. Infection was higher in April, May and June and lower in winter. M. Yoshida

107—TURNER, L. H., 1959. [Institute for Medical Research, Federation of Malaya.] "Studies on filariasis in Malaya: the clinical features of filariasis due to *Wuchereria malayi*." **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 154-169. Recent information suggests that in Malaya two forms of *Wuchereria malayi* exist, a periodic and a semi-periodic, although the clinical features of both diseases are similar. Data obtained from Penang on the periodic form showed that enlarged lymph nodes are not characteristic although recurrent acute adenitis and lymphangitis, often starting without apparent cause, are. Retrograde spread of the lymphangitis, mainly in the legs, is characteristic. The disease is not periodic but episodic. Elephantiasis of the legs is common, is often bilateral, and tends to get progressively worse. The acute episodes are probably allergic manifestations. The prepatent stage was 76-80 days. The two forms of *W. malayi* show only minor microscopical differences. There is also a brief discussion of tropical eosinophilia. W. K. Dunscombe

108—TURNER, L. H., 1959. [Institute for Medical Research, Kuala Lumpur, Federation of Malaya.] "Studies on filariasis in Malaya: treatment of *Wuchereria malayi* filariasis with diethylcarbamazine in single daily doses." **Annals of Tropical Medicine and Parasitology**, 53 (2), 180-188. Turner reports that single daily doses of diethylcarbamazine are as effective as three doses daily against the microfilariae of *Wuchereria malayi*. Doses between 0.1 mg. and 0.5 mg. per kg. body-weight reduced the numbers of microfilariae in the peripheral blood-stream slowly, whereas doses above 1.0 mg. per kg. acted more rapidly but caused febrile reactions. The febrile symptoms subsided when the numbers of microfilariae fell and the daily dose could be increased to the maximum tolerated level without the appearance of side effects. The response to the drug, the resulting febrile reaction and the maximum tolerated dose varied from patient to patient and it was difficult to predict individual reactions; even so, an initial daily dose of 0.25-0.5 mg. per kg. is suggested for patients with high microfilarial counts and,

when the febrile symptoms subside, single daily doses of up to 10 mg. per kg. could probably be tolerated. The long-term results were disappointing, microfilariae reappearing in the peripheral blood of 11 out of 34 patients, but this may have been due to reinfection.

P. Williams

109—YAJIMA, F., 1959. [Department of Public Health, School of Medicine, Chiba University, Japan.] [Studies on hookworm carriers in view of public health. 1. On the age incidence curve in hookworm infection and its epidemiological consideration.] *Japanese Journal of Parasitology*, 8 (2), 209-215. [In Japanese: English summary p. 215.]

The curve obtained by plotting incidence of hookworm infection in relation to age showed no significant difference between *Ancylostoma duodenale* and *Necator americanus*, the peak occurring in the 30-40 age group in both cases. The decline of the curve on either side of the peak was not equal, being steeper towards the younger group. Yajima suggests that the cutaneous rather than the oral route is usual for hookworm infection, except in the colder parts of Japan.

M. Yoshida

110—YAJIMA, F., 1959. [Department of Public Health, School of Medicine, Chiba University, Japan.] [Studies on hookworm carriers in view of public health. 2. On the previous estimation of total incidence of hookworm infection in an area.] *Japanese Journal of Parasitology*, 8 (2), 216-222. [In Japanese: English summary p. 222.]

From her statistical survey of hookworm infection, Yajima deduced an empirical formula, $y = 1.70 e^{-0.0057x} - 2.00^{-0.087x}$, where x is the age of a class to be tested and y is the frequency of incidence in the class, relative to that in the whole population. The minimum variance was observed in the 16-20 age group.

M. Yoshida

111—ZIMMERMANN, W. J., HUBBARD, E. D. & MATHEWS, J., 1959. [Veterinary Medical Research Institute, Iowa State College, U.S.A.] "Studies on fecal transmission of *Trichinella spiralis*." *Journal of Parasitology*, 45 (4), 441-445.

For the study of the faecal transmission of *Trichinella spiralis*, fox cubs and albino rats were used as donors and were placed in cages over the feed troughs of the recipient pig hosts. About 95% of the larvae recovered from the faeces of the donors (by the Baermann technique) were eliminated during the first 24 hours after infection. Transmission occurred most readily four hours after infection. Higher infection rates in pigs were achieved when donors with previously acquired immunities were used. Thus 12 of 13 pigs became infected from foxes with primary infections and all nine pigs from foxes with secondary infections, and the number of larvae in a 45 gm. sample of the pig diaphragm was greater in the latter case. A third factor influencing transmission was the number of viable larvae ingested by the donor animals. Transmission was less successfully demonstrated from rat to pig and did not occur at all in one trial from rat to fox and in two trials from rat to rat.

G. I. Pozniak

Nematomorpha

No relevant abstracts in this issue

Hirudinea

No relevant abstracts in this issue

Pentastomida

No relevant abstracts in this issue

Miscellaneous

See also Nos.: 344, 345, 406, 425.

112—AGUILAR, F. J., 1959. [School of Medicine, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala.] "The polyanthelmintic action of dithiazanine iodide. Verification of its effectiveness in the most common helminthiases in Guatemala." **American Journal of Tropical Medicine and Hygiene**, 8 (3), 305-306.

In Guatemala City, 100 persons of both sexes aged from 2 to 53 years suffering from helminthiases were treated with dithiazanine iodide. Adults were given the drug in doses of 200 mg. two or three times daily for five days; in children the dosage varied according to body-weight. The results showed that the drug was not satisfactory for *Taenia saginata* and *Hymenolepis diminuta* infections, but 80% of *H. nana* infections were cured. 100% of *Enterobius* and *Strongyloides* infections were cured and 87% of *Ascaris*, 86% of *Trichuris* and 62% of hookworm. Slight side effects occurred in nine persons.

W. K. Dunscombe

113—ANON., 1959. "Twelfth World Health Assembly." **WHO Chronicle**, 13 (7/8), 283-295.

Three helminthic disease groups occupied *inter alia* the particular attention of the Assembly—bilharziasis, the filariases and trichuriasis. It was reported that, in the Sudan, complete eradication of the snail vectors of bilharziasis in the country's 8,000 kilometre network of irrigation canals had been achieved and maintained for four years. In Iraq, South Africa and Ghana development plans involving irrigation projects either have led, or are expected to lead, to spread of this disease. Attention was drawn to the development of age resistance to bilharziasis in Uganda and to the possibility that indiscriminate treatment may destroy natural immunity in some areas. Several delegates stressed the importance of WHO-assisted research on the epidemiology, treatment and prevention of onchocerciasis in Africa, (especially Ghana, Nigeria and Sierra Leone) and Venezuela. Such study has recently been undertaken in the Sudan. This disease has now been reported from Aden and the Yemen. A nation-wide programme of endemic filariasis control has been started in India. It was suggested by several delegates that WHO should give more attention to this infection, especially in the Pacific, western Ceylon and Indonesia. The principal cause of diarrhoea and enteritis among infants under two years of age in Cuba is intestinal parasitism, especially with *Trichuris*, with which almost 100% of the inhabitants of certain areas are infected.

J. M. Watson

114—ANON., 1959. "Joint WHO/FAO Expert Committee on Zoonoses. Second Report." **World Health Organization. Technical Report Series**, No. 169, 83 pp.

This report reviews *inter alia* the present position in relation to the more important helminthic zoonoses (hydatidosis, cutaneous and visceral larva migrans, fascioliasis and bilharziasis). Stress is laid on points requiring further research for their elucidation. Annex I includes a list of 24 helminthic diseases naturally transmitted between vertebrate animals and man. Annex III recommends that hydatidosis, fascioliasis, taeniasis, cysticercosis, trichinelliasis and visceral larva migrans should be notifiable in all countries, and that bilharziasis, clonorchiasis, cutaneous larva migrans, diphyllobothriasis, hymenolepidiasis, opisthorchiasis, paragonimiasis and sparganosis should be notifiable where locally prevalent.

J. M. Watson

115—BARROS, A. A. DE, 1958. [Chief Medical Officer, Portuguese Guinea.] "Os Serviços de Saúde da Província da Guiné." **Anais do Instituto de Medicina Tropical. Lisbon**. 15, Suppl. 2, pp. 45-57. [Also in English pp. 58-64.]

The health service in Portuguese Guinea is reviewed. Ancylostomiasis affects 90% of the native inhabitants and bancroftian filariasis 50% in certain areas. Vesical schistosomiasis is increasing slowly and onchocerciasis and taeniasis also occur.

W. K. Dunscombe

116—BASNUEVO, J. G., 1957. "Memorandum terapéutico antiparasitario." **Revista Kuba de Medicina Tropical y Parasitología**, 13 (7/12), 87-95.

Basnuevo reviews *inter alia* the standard treatments for infection with *Trichuris trichiura*, *Ascaris lumbricoides*, *Necator americanus* and *Ancylostoma duodenale*, *Enterobius vermicularis*, *Strongyloides stercoralis*; *Taenia saginata*, *Hymenolepis nana* and other tapeworms; *Fasciola hepatica*, *Clonorchis sinensis* and *Paragonimus westermani*.

J. M. Watson

117—CASACA, V. M. R., 1958. [Institute for Medical Research of Angola.] "Instituto de Investigação Médica de Angola (Missão de Prospeção de Endemias). (De Dezembro de 1951 até Junho de 1958)." **Anais do Instituto de Medicina Tropical. Lisbon**, 15, Suppl. 1, pp. 335-363. [Also in English pp. 364-375.]

In this report, which covers a period from December 1951 to June 1958, matters likely to be of interest to helminthologists are the investigation of schistosomiasis and its vectors, of other intestinal helminths, of onchocerciasis and the study of Simuliidae. *Schistosoma mansoni* infections occur in the Upper Zambezi area with *Bulinus* spp. and *Biomphalaria* spp. as the most likely vectors. *Ancylostoma*, *Ascaris*, *Enterobius*, *Trichuris*, *Taenia* spp., *Hymenolepis nana* and *Strongyloides* are also found in Angola as human infections. The principal vector of onchocerciasis in the area is *Simulium damnosum*.

W. K. Dunscombe

118—DMITRIENKO, N. K. & GROSHKOVA, I. M., 1957. [Respublikanskaya sanitarno-epidemiologicheskaya stantsiya Ministerstva zdravookhraneniya Kazakhskoi SSR.] [Achievements in the control of parasitic diseases in Kazakhstan during the last ten years.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 679-684. [In Russian.]

The following helminthiases are mentioned—ancylostomiasis, ascariasis, taeniasis and hymenolepidiasis.

G. I. Pozniak

119—FEIO, F. B., 1958. "Os Serviços de Saúde da Província de Angola. Considerações sobre a nosologia." **Anais do Instituto de Medicina Tropical. Lisbon**, 15, Suppl. 2, pp. 101-130. [Also in English pp. 131-150.]

Feio gives an account of the health services of Angola. Vesical schistosomiasis is wide-spread. The incidence of onchocerciasis is high in three areas but blindness due to it has not been detected. In the forest areas simulicides spread by helicopter have not been very successful in controlling the vector, neither has prophylaxis by hetricazan significantly affected the status of the disease in man.

W. K. Dunscombe

120—FERREIRA, E., 1958. [Comissão de Higiene e Saúde do Ultramar.] "Organização dos Serviços de Saúde do Ultramar." **Anais do Instituto de Medicina Tropical. Lisbon**, 15, Suppl. 2, pp. 5-11. [Also in English pp. 12-18.]

In reviewing the fight against endemic diseases in the Portuguese overseas territories, Ferreira stresses the importance of improved sanitation and raised economic levels in reducing the incidence of bilharziasis.

J. M. Watson

121—IDELCHIK, K. I., 1957. [Otdel istorii meditsini Instituta zdravookhraneniya i istorii meditsini imeni N. A. Semashko.] [The history of medical parasitology in the Soviet medical literature.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 695-700. [In Russian.]

122—MEIRA, M. T. V. DE, 1958. "A Missão Permanente de Estudo e Combate de Endemias de Cabo Verde." **Anais do Instituto de Medicina Tropical. Lisbon**, 15, Suppl. 1, pp. 415-422. [Also in English pp. 423-429.]

In the Cape Verde archipelago among the helminth infections of man which occur are ancylostomiasis and other intestinal helminthiases, bancroftian filariasis and fascioliasis. Onchocerciasis and schistosomiasis are absent as the vectors do not occur. A special campaign of eradication is being carried on against bancroftian filariasis on St. James Island.

W. K. Dunscombe

123—PINTO, A. R. DA C., 1958. "Relatório anual da Missão Permanente de Estudo e Combate da Doença do Sono e outras Endemias na Guiné Portuguesa (1956)." **Anais do Instituto de Medicina Tropical. Lisbon**, 15 (4), 1023-1060.

Among helminthic diseases in Portuguese Guinea, ancylostomiasis is very prevalent, filariasis due to *Wuchereria bancrofti* and *Acanthocheilonema persans* is present, taeniasis saginata is notable in one area and schistosomiasis haematobia also occurs. Ancylostomiasis is treated by a four-day course of tetrachlorethylene at a dose rate of 0.12 c.c. per kg. body-weight with a maximum of 4 c.c., without a purgative, followed by iron sulphate to raise the haemoglobin level.

W. K. Dunscombe

124—PINTO, A. R., 1958. "Missão Permanente de Estudo e Combate da Doença do Sono e outras Endemias na Guiné Portuguesa." *Anais do Instituto de Medicina Tropical. Lisbon, 15*, Suppl. 1, pp. 431-453. [Also in English pp. 454-467.]

Although the main business of the Mission is trypanosomiasis it has also tried to treat active cases of ancylostomiasis which is wide-spread with an incidence of from 10% to 98% in different areas. Taeniasis (*Taenia saginata*), which is especially prevalent in one area, has also been attacked.

W. K. Dunscombe

125—RICCI, M., & CORBO, S., 1959. [Istituto Superiore di Sanità, Laboratorio di Parassitologia, Rome.] "Parassitismo intestinale e posizione auxologica del bambino." *Rivista di Parassitologia, 20* (1), 33-47. [English summary p. 47.]

Ricci & Corbo have studied the influence of intestinal parasites on the growth of children in Latina province. Altogether 796 children were examined using the auxograms of Correnti, based on the relation between height, chest circumference and weight. Comparison of morphological values (height—chest circumference) of parasite-free children and children with all degrees of infection grouped together, did not show any appreciable differences. Differences were only apparent between the morphological values of parasite-free subjects and those of the children with a higher degree of infection (more than two parasites). The differences were even more marked when the relation of height-weight and age was taken into consideration. As the number of parasites increased, the number of subjects with arrested growth increased also. The authors conclude that intestinal parasites had a detrimental effect on the growth of children.

N. Jones

126—RUZIEV, K. K., 1957. [Parazitologicheski otdel Kirgizskoi respublikanskoi sanitarno-epidemiologicheskoi stantsii.] [Control of parasitic diseases in the Kirgizian S.S.R. during the last ten years.] *Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow, 26* (6), 684-687. [In Russian.]

It is stated *inter alia* that work against helminths has been expanding and is of a planned character.

G. I. Pozniak

127—SANTOS GARCIA, L. A. dos, 1958. [Director, Health Service, Goa.] "Os Serviços de Saúde no Estado da India Portuguesa." *Anais do Instituto de Medicina Tropical. Lisbon, 15*, Suppl. 2, pp. 263-288. [Also in English pp. 289-305.]

The health services of Goa are described. Bancroftian filariasis is prevalent in several areas. Examination for this disease is compulsory and treatment is by hetrazan. For anti-mosquito measures, efforts have been concentrated on the larvae as adult Culicidae rapidly acquire resistance to D.D.T. and gammexane.

W. K. Dunscombe

128—SILVA, J. F. DA, 1958. [Health and Hygiene Services, Mozambique.] "Os Serviços de Saúde e Higiene da Província de Moçambique. Organização dos Serviços de Saúde. (Relatório e estatística referentes a 1956)." *Anais do Instituto de Medicina Tropical. Lisbon, 15*, Suppl. 2, pp. 151-199. [Also in English pp. 200-239.]

The health services of Mozambique are described. Among many other diseases, schistosomiasis due to *Schistosoma haematobium* is wide-spread, *S. mansoni* is present to a less extent, and ancylostomiasis also occurs.

W. K. Dunscombe

129—SOEIRO, A., 1958. [Institute for Medical Research, Mozambique.] "O Instituto de Investigação Médica de Moçambique." *Anais do Instituto de Medicina Tropical. Lisbon, 15*, Suppl. 1, pp. 377-399. [Also in English pp. 400-414.]

As with the Angola Mission, that of Mozambique functions under the aegis of the Institute of Tropical Medicine at Lisbon. Both vesical and intestinal schistosomiasis are found in Mozambique, the former being wide-spread, the latter occurring only in restricted foci. The vectors in the island of Inhaca seem to be *Physopsis globosus* and *Bulinus forskalii*. In the Limpopo valley recently arrived Europeans showed an appreciable *Schistosoma haematobium* incidence, pointing to hyperendemicity among the Africans resident there. Incidence of infection with intestinal parasites reaches over 90% in some areas. *Ascaris lumbricoides*, *Trichuris* and hookworms were the species most frequently encountered.

W. K. Dunscombe

130—ZERCHANINOV, L. K. & SOKOLOVA, E. K., 1957. [Parazitologicheski otdel nauchno-issledovatel'skogo instituta epidemiologii i mikrobiologii Ministerstva zdravookhraneniya RSFSR.] [Opisthorchis and Diphyllobothrium infections in the Sverdlovsk region.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni**. Moscow, **26** (6), 714-717. [In Russian: English summary p. 717.]

Foci of *Diphyllobothrium* and *Opisthorchis* infections were present in river areas of the northern Sverdlovsk region. The Tabory population was more heavily infected than that of Gari, this difference being correlated with the amount of raw fish consumed. These infections were also wide-spread among children.

G. I. Pozniak

VETERINARY HELMINTHOLOGY

Horses, Donkeys and Mules

See also Nos.: 91, 151, 368, 392.

131—DIMIĆ, J., ŠIBALIC, S. & TADIĆ, M., 1959. [Klinik für Chirurgie, Hufkunde und Augenheilkunde.] "Periodische Augenentzündung und Augenfilariose der Pferde." **Wiener Tierärztliche Monatsschrift**, **46** (5), 374-380. [English, French & Italian summaries pp. 379-380.]

Dimić *et al.* examined the cornea of 183 horses. In 57.4% the eyes harboured microfilariae of *Onchocerca cervicalis* and 28.8% of the horses showed signs of periodic ophthalmia or microfilariasis of the cornea. In 49% of the cases microfilariae were present but no ocular changes were found. In only 22.2% of the cases examined were clinical signs of moon blindness found. A substrate was prepared from corneal material and injected into the anterior chamber of the eye of 56 healthy horses. The resulting ocular reactions were identical in all cases regardless of whether they were caused by material infected with microfilariae or by healthy material. They were less intense in foals. The authors conclude that equine corneal filariasis is not of primary importance in the aetiology of moon blindness in the horse.

N. Jones

132—JIŘINA, K., 1959. "Über das Vorkommen der Setarien bei Pferden." **Deutsche Tierärztliche Wochenschrift**, **66** (16), 439-441. [English summary p. 441.]

Jiřina found that 35.9% of 2,407 horses slaughtered at the Prague abattoir during a period from July 1957 to June 1958 harboured *Setaria equina*. This infection was found in 20.5% of horses coming from Bohemia and Moravia, 51.4% from Slovakia, 23.9% from Bulgaria and 53.3% from Rumania. The parasites remained alive for from 2-20 hours after being recovered from body-cavities and placed in a humid environment. The presence of filamentous layers on the abdominal surface of the diaphragm and signs of recent peritoneal inflammation suggest that the presence of *Setaria* in the abdominal cavity may be more harmful than was hitherto believed.

N. Jones

133—MAROLT, J. & VUKELIĆ, E., 1959. [Veterinär-chirurgischen Klinik der Universität Zagreb.] "Cortison in der Therapie der rezidivierenden Widerristschäden (Onchocercosis) beim Pferd." **Deutsche Tierärztliche Wochenschrift**, **66** (14), 377-379. [English summary p. 379.]

Marolt & Vukelić treated 30 horses suffering from *Onchocerca cervicalis* lesions of the withers, by puncture and evacuation of the nodule contents followed by one or two injections, within seven to fourteen days, of 125 to 250 mg. of a cortisone preparation mixed with procaine penicillin. In 20 of the horses treated the swellings disappeared completely, in eight they were markedly reduced, and in two only was there no improvement. Five animals suffered a relapse. Typically these nodules are fluctuating tumours, palpable through the intact skin, with aseptic contents. They are most frequent where periodic ophthalmia is prevalent, occur mainly in spring, and usually affect horses between two and four years old.

J. M. Watson

Cattle

See also Nos.: 42, 91, 163, 223, 228, 230, 287, 340, 353, 359, 376, 416, 420, 421, 426.

134—BECKLUND, W. W., 1959. [Animal Disease & Parasite Research Division, Agricultural Research Service, Coastal Plain Experiment Station, Tifton, Georgia, U.S.A.] "Worm parasites in cattle from South Georgia." **Veterinary Medicine**, 54 (7), 369-372.

Becklund carried out post-mortem examinations on 29 cattle aged 6-18 months from abattoirs of the Coastal Plain region of Georgia. Altogether 18 nematode species were found. Each animal harboured from three to eight parasite species. The incidence of infection was: *Haemonchus* spp. (82%), *Cooperia punctata* (82%), *Trichostrongylus axei* (72%), *Ostertagia ostertagi* (72%), *Oesophagostomum radiatum* (69%), *C. pectinata* (52%), *H. similis* (41%), *Setaria cervi* (34%), *Bunostomum phlebotomum* (28%), *Capillaria bovis* (17%), *Trichuris* sp. (17%), *Ostertagia lyrata* (17%), *Gongylonema pulchrum* (10%), *Trichostrongylus colubriformis* (7%), *T. longisicularis* (7%), *Cooperia spatulata* (7%) and *Strongyloides papillosus* (3%).

N. Jones

135—BELL, R. R., TURK, R. D. & GALVIN, T. J., 1959. [A. & M. College of Texas, College Station, Texas, U.S.A.] "Incidence of certain gastrointestinal parasites of cattle in Texas." **American Journal of Veterinary Research**, 20 (77), 766-767.

Bell *et al.* examined cattle from eight regions in Texas. The following helminths were found from the abomasum and the small intestine: *Haemonchus*, *Ostertagia*, *Bunostomum*, *Nematoditirus*, *Trichostrongylus* and *Cooperia*. The incidence of infection, according to three age groups, i.e. adults, yearlings and calves, is given in a graph.

N. Jones

136—BICHE, Y. & THIENPONT, D., 1959. "Etude statistique de la cysticercose bovine au Ruanda-Urundi." **Annales de Médecine Vétérinaire**, 103 (1), 27-35.

Biche & Thienpont review the incidence of bovine cysticercosis in Ruanda-Urundi. The authors first examined a bovine carcass by the usual meat inspection incisions and detected 15 cysts. Repeated multiple incisions showed the actual number to be 224 and they therefore conclude that each cyst found at meat inspection represents 15-20 in actual number. Routine inspection of 750 carcasses showed an incidence of 69% cysticercosis. The predilection sites were the neck, tongue and head and 75% of the carcasses had only one to ten cysts.

G. M. Urquhart

137—CORNWELL, R. L., 1959. [Department of Veterinary Preventive Medicine, University of Liverpool, Field Station, "Leahurst", Neston, Wirral, Cheshire, U.K.] "Parasitic bronchitis: the vaccinated calf as a carrier." [Correspondence.] **Veterinary Record**, 71 (27), 562.

The author suggests that vaccination may not always be sufficient to protect against a natural infection of *Dictyocaulus viviparus* which may proceed with or without clinical symptoms and result in the excretion of larvae in the faeces. Such calves are a potential source of infection to unvaccinated stock. Cornwell gives an instance of calves, which had received a double-dose vaccination with X-irradiated larval vaccine, excreting larvae about eight weeks after the second dose. The pasture on which these animals had been grazing was not expected to produce a high level of infective larvae. Some 31 days after introduction of the vaccinated calves to lungworm-free pasture, larvae began to appear in the faeces of unvaccinated calves with which they had been grazing and both vaccinated and unvaccinated animals were coughing.

K. Heath

138—COYLE, T. J., 1958. [Animal Health Research Centre, Entebbe, Uganda.] "Experiments in the diagnosis and treatment of fascioliasis in Uganda cattle." **Bulletin of Epizootic Diseases of Africa**, 6 (3), 255-272. [French summary pp. 288-294.]

Attention is drawn to the scarcity of literature on the pathology, treatment and control of infection with *Fasciola gigantica*, a common parasite of cattle in Uganda. Abattoir records correlating the number of flukes with the degree of liver damage are given. There is evidence that resistance occurs. Results of work with *F. hepatica* infection in European cattle are discussed in relation to *F. gigantica* infection in African cattle. Diagnostic methods are

discussed and an improved technique of determining *F. gigantica* ova in faeces by continuous washing and sedimentation is described. Figures are given for the correlation of faecal egg counts with the number of flukes in the liver. Attention is drawn to the necessity for large samples of faeces and repeated counts over a long period. The difficulties of treatment under African conditions are emphasized with the consequent advantages of a parenteral route of drug administration. Carbon tetrachloride subcutaneously was disappointing, but trials are not yet complete. Hexachlorethane by mouth was promising. No toxicity was encountered with either drug. The habitats of the intermediate host are mentioned. It is considered that chemical attack on the snail would not be satisfactory. Infection can be prevented by watering stock by means of troughs, ram pumps, tanks, etc.

T. J. Coyle

139—DAVIS, L. R., HERLICH, H. & BOWMAN, G. W., 1959. [Regional Animal Disease Research Laboratory, U.S. Department of Agriculture, Auburn, Alabama, U.S.A.] "Studies on experimental concurrent infections of dairy calves with coccida and nematodes. I. *Eimeria* spp. and the small intestinal worm, *Cooperia punctata*." *American Journal of Veterinary Research*, **20** (75), 281-286.

Davis *et al.* used 25 worm-free male calves for two experiments to determine the effect of infection with *Eimeria* spp. and *Cooperia punctata*. In the first experiment two calves each received one million oocysts and 245,000 infective larvae of *C. punctata*, five calves received one million oocysts only and three calves received 245,000 larvae only. Four calves received neither oocysts nor larvae. In the second experiment the general plan was similar but the infecting doses were altered: 3,000 oocysts per pound body-weight were used (as compared with about 10,000) and the number of larvae per animal was increased to at least 300,000. Calves given both oocysts and larvae were most severely affected and calves given oocysts alone were more affected than those given only larvae. In animals with *Cooperia* infections only, one third of the worms were immature when the calves were slaughtered. In animals with both *Eimeria* and *Cooperia* infections less than 15% of the worms were immature although the total worm burdens were similar in the two groups. The authors conclude that the presence of coccidia interfered with the calves' immune responses to worm infection.

H. D. Crofton

140—DAVIS, L. R., HERLICH, H. & BOWMAN, G. W., 1959. [Auburn, Alabama.] "Studies on experimental concurrent infections of dairy calves with coccidia and nematodes. II. *Eimeria* spp. and the medium stomach worm, *Ostertagia ostertagi*." *American Journal of Veterinary Research*, **20** (76), 487-491.

Davis *et al.* infected three calves with oocysts of *Eimeria* spp., three with infective larvae of *Ostertagia ostertagi* and three with both oocysts and infective larvae. Two animals were left as controls. After three weeks one animal from each treated group was slaughtered and examined. The remaining calves were weaned and, a month later, given challenge inoculations of the organisms to which they had been exposed previously. The authors conclude from clinical observations, weight records and examinations of faeces that the *Eimeria* infections affected the calves more severely than the *Ostertagia* infections. No synergic effect was observed when animals were infected with both *Eimeria* and *Ostertagia*. These results are compared with those observed from experiments with *Eimeria* and *Cooperia* reported previously. [See abstract No. 139 above.]

H. D. Crofton

141—ENIGK, K. & DÜWEL, D., 1959. [Institut für Parasitologie und vet.-med. Zoologie der Tierärztlichen Hochschule Hannover.] "Die Wirksamkeit von Cyanacethydrazid beim Lungenwurmbefall des Rindes." *Deutsche Tierärztliche Wochenschrift*, **66** (14), 379-382. [English summary p. 382.]

243 cattle were treated either subcutaneously or orally with cyanacethydrazide. Only nine out of 69 of these animals which had a slight infection were cured by the treatment. Many of the lungworms were only slightly impaired as was shown by a temporary reduction in the larval counts. The single treatment of 81 cattle with aerosols of ascaridole produced a cure in 76 of these animals. The treatment, however, does not alleviate the severe pathological lesions caused by the infections and thus attention must be paid to pasture infestation. K. Heath

142—ENIGK, K. & DÜWEL, D., 1959. [Institut für Parasitologie und vet.-med. Zoologie der Tierärztlichen Hochschule Hannover.] "Zur Häufigkeit der pränatalen Infektion mit *Fasciola hepatica* beim Rinde." **Berliner und Münchener Tierärztliche Wochenschrift**, 72 (18), 362-363. [English summary p. 363.]

Enigk & Düwel found 7.9% of 661 calves under 12 weeks old to be infected with sexually mature *Fasciola hepatica*. The authors conclude that post-natal infection was excluded in the case of calves up to nine weeks old and pre-natal infection was also probable with 9 to 12-week-old calves. Pre-natal infection with this parasite is therefore a less rare phenomenon than has been generally supposed.

N. Jones

143—ERSHOV, V. S., DEMIDOV, N. V. & SAKATUNOV, S. V., 1959. [Vsesoyuzni institut gelmintologii imeni akademika K. I. Skryabina.] [Phenothiazine for the prevention of helminths in cattle.] **Veterinariya**, 36 (8), 25-27. [In Russian.]

Ershov *et al.* gave 1.5 gm.-3.0 gm. of phenothiazine mixed with 200 gm.-300 gm. of concentrates, per day to 28 head of cattle from 15th May to 4th December. Clinical observations and thorough examinations of blood and urine during the experiment did not reveal any deviations from the normal physiological picture due to treatment. In October, single strongyle eggs were found in the faeces of three experimental and three control animals. Fascioliasis was observed in 31.8% of the treated and in 40% of non-treated animals. The following February repeated examination showed the same results. The gain in weight was 44 kg. per animal in the experimental group, compared with a loss of 26 kg. in the control group. The milk yield from ten experimental cows was 5,138 kg. higher than that from the same number of control cows.

N. Jones

144—GEE, R. W., 1958. [Nicholas Pty. Ltd., 699 Warrigal Road, Chadstone, Victoria, Australia.] "Disease problems of dairy cattle in irrigation areas." **Australian Veterinary Journal**, 34 (11), 352-357. [Discussion pp. 357-360.]

Gee, in a discussion on disease problems of dairy cattle in the Goulburn Valley irrigation areas of Victoria, Australia, draws attention to the importance of fascioliasis (and black disease) in sheep and fascioliasis and paramphistomiasis in cattle. Control of the snail intermediate host is difficult, particularly in sheep areas where the use of copper sulphate is contra-indicated because of the constant danger of chronic copper poisoning. Hexachlorethane is very efficient against flukes in cattle.

F. H. S. Roberts

145—GOLDBERG, A., 1959. [Beltsville, Maryland, U.S.A.] "The relationship of diet to gastro-intestinal helminth parasitism in cattle." **American Journal of Veterinary Research**, 20 (78), 806-814.

Goldberg studied the relationship between diet and gastro-intestinal helminth parasitism in cattle. The parasites used were *Oesophagostomum radiatum*, *Cooperia punctata*, *C. oncophora*, *Ostertagia ostertagi*, *Haemonchus contortus* and *Trichostrongylus axei*. The diets compared were (i) second-cutting fescue hay versus U.S. No. 2, 50% green lucerne hay and (ii) fresh fescue, slightly mixed with other herbs, versus a fresh legume-grass mixture. Comparable parasite-free cattle were placed on each diet. 16 animals were infected and 14 were maintained as controls. The author stated that, in comparably infected animals, there did not appear to be a significant difference in the effect of the fescue and other diets on weight gains and that, in general, infected animals showed about the same degree of inappetence on each diet. He found that the effect of moderate to heavy parasitism on rate of gain was usually considerably greater than the effect of the difference in diets and, that in comparable infections, clinical signs were similar in severity, irrespective of diet. He also found that more worm eggs per gramme were passed in the faeces of the animals fed fescue and when the comparison was limited to those animals which were killed at comparable intervals after infection, 16% more worms were recovered from those fed fescue than from those on the other diets. He found that the rate of development of the worms did not appear to be significantly affected by diet and that there was no marked difference in the number of intestinal lesions caused by *Oesophagostomum radiatum* in the animals on the different diets.

C. Hatch

146—GOLDBERG, A. & LUCKER, J. T., 1959. [Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Dept. of Agriculture, Beltsville, Maryland, U.S.A.] "Survival on pasture of larvae of gastrointestinal nematodes of cattle. II. Spring contamination." **Proceedings of the Helminthological Society of Washington**, **26** (1), 37-42.

During May each of five small plots of pasture was contaminated with cattle faeces estimated to contain about 95 million eggs of nematode parasites of cattle. Test grazings were made, one worm-free calf being used to graze each plot, and each plot grazed for one period of about two weeks. The test grazings occurred 21, 63, 126, 171 and 329 days after the plots were contaminated. Goldberg & Lucker conclude that infective larvae of *Cooperia oncophora*, *Nematoditus helveticus* and *Ostertagia ostertagi* survived longer than those of *Trichostrongylus axei*, *C. punctata* and *Oesophagostomum radiatum*, and that only the larvae of the first two species and eggs of *Trichuris* survived the winter. The rate of reduction of numbers of larvae infective to calves appeared to be lower than that which occurred in similar experiments started during the summer months and described previously [for abstract see *Helm. Abs.*, **25**, No. 31m].

H. D. Crofton

147—HERLICH, H., 1959. "Experimental infections of cattle with the stomach worms, *Ostertagia ostertagi* and *Trichostrongylus axei*." **Proceedings of the Helminthological Society of Washington**, **26** (2), 97-102.

Herlich has studied the effects of pure and mixed infections of *Ostertagia ostertagi* and *Trichostrongylus axei* on grade Jersey calves reared worm free. It was found that a dose of 500,000 larvae of *O. ostertagi* may be lethal but calves given a similar number of *T. axei* larvae survived. At sub-lethal levels (250,000 larvae), although both species caused similar retardation of weight gains, results suggested that *O. ostertagi* is the more pathogenic species. It was also noted that a combination of the two species (125,000 larvae each) was markedly more pathogenic than either species alone (250,000 larvae), apparently because mixed infections enhance the chances of the establishment of the larvae and of their development to adults.

F. H. S. Roberts

148—HOFLUND, S., 1959. [Bujatrischen Klinik der Königlichen Tierärztlichen Hochschule, Stockholm.] "Kälberkrankheiten in Mastbeständen." **Deutsche Tierärztliche Wochenschrift**, **66** (14), 373-377. [English summary p. 377.]

Hoflund remarks, *inter alia*, that stock diseases due to intestinal parasites were formerly of relatively infrequent occurrence in Sweden. The transition from dairy farming to the breeding of beef cattle, however, with resulting concentration of large numbers of calves and young animals in restricted and undivided grazing areas, has led to a serious increase of helminthic infection. In particular, lungworms have caused heavy losses in some herds. Attention must therefore be directed to this potential danger. A national system of pastoral hygiene should be adopted in order to prevent these infections, since growth will continue to be retarded and loss of weight will not be regained in calves which are allowed to become thin before anthelmintic treatment is given.

J. M. Watson

149—KOMJÁTHY, K., 1957. "Szarvasmarhák májmétykójának orvoslása bőr alá fecskendezett széntetrakloriddal." **Magyar Allatorvosok Lapja**, **12** (7/9), 235-236. [English & Russian summaries p. 236.]

Virulent liver-fluke infection occurs extensively in cattle on wet pastures especially those close to rice fields. The disease has a quick course and high mortality rate owing to heavy worm burden. After successful experiments with subcutaneous carbon tetrachloride therapy in sheep the method was used in infected cattle. Pure carbon tetrachloride seemed to be more efficacious than a mixture of carbon tetrachloride and paraffin in equal parts. 5-15 ml. of the drug was administered per 100 kg. of body-weight. Faecal examination on the 12th day after treatment showed that four of the nine cattle were still infected. After a second treatment on the 24th day only two still showed active liver-fluke infection. This treatment cannot be applied on very fat or undernourished cattle. It is advisable to give carbohydrate-rich fodder to the cattle before treatment.

H. Pogany

150—KOVÁCS, F., 1957. "Szarvasmarhák májmételek körjának orvoslása bőr alá fecskendezett szén-tetrakloriddal." [Treatment of fascioliasis in cattle by subcutaneous injection of carbon tetrachloride.] *Magyar Allatorvosok Lapja*, **12** (12), 369-373. [English & Russian summaries p. 373.]

151—LELAND, Jr., S. E., DRUDGE, J. H., WYANT, Z. N., ELAM, G. W. & HUTZLER, L. B., 1959. [Lexington, Kentucky, U.S.A.] "Studies on *Trichostrongylus axei* (Cobb, 1879). IV. Some aspects of treatment, pathogenicity, and quantification in experimental infections of a horse strain in calves." *American Journal of Veterinary Research*, **20** (78), 787-794.

Leland *et al.* administered infective larvae of a horse strain of *Trichostrongylus axei* to 14 calves, three to five months old at the time of infection. Three of these calves subsequently received anthelmintic treatment. They found in the eleven untreated calves that the 50% lethal dose was 500,000 larvae and they stated that the pathogenicity of this horse strain of *T. axei* to calves appeared greater than that of other strains studied in these animals. They also found that the worm recovery from the eleven untreated calves ranged from 59.9% at 41,000 larvae administered to 12.3% at one-and-a-half million larvae administered; that the interval between infection and death ranged from 17 to 39 days; that the male:female worm ratio averaged 0.77; that the average prepatent period in 12 calves was 21.3 days and that the egg-laying potential in six animals averaged 41.6 eggs per 24 hours per female worm. They observed that, with one exception, all calves given 209,000 or more larvae showed gross pathological changes at necropsy, and that the severity of the changes was, in general, proportional to the number of larvae administered, and that in calves given 500,000 or more larvae, the packed erythrocyte volume (PCV) was decidedly elevated three weeks after infection but that, thereafter, in surviving animals the PCV dropped, and that from the ninth week to the end of the observation period the PCV was reduced below normal. They found that the administration of phenothiazine at 20 gm. per 100 lb. resulted in a treatment efficacy of 50 to 98.8%, two treatments being necessary to achieve the 98.8% worm removal. They state that there is a suggestion of a selective action by the drug on the female worms.

C. Hatch

152—PITCHFORD, R. J., 1959. [South African Council for Scientific and Industrial Research, Biltfontein Field Unit, Nelspruit, Eastern Transvaal.] "Cattle schistosomiasis in man in the Eastern Transvaal." *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **53** (3), 285-290.

Pitchford, working in the Eastern Transvaal, found terminal-spined schistosome eggs in man, indistinguishable from those occurring in cattle, sheep and goats. These eggs were polymorphic and varied from the classical *Schistosoma bovis* form to the wider-ended spindle shape of *S. mattheei*. Whether obtained from man, domestic animals or laboratory mice, they were consistently rather less than twice the length of *S. haematobium* eggs. In one district as many as 23% of those examined were thus infected. The eggs were found in the urine and faeces of man in almost equal numbers. All subjects examined were also infected with *S. haematobium* and all but one with *S. mansoni*. The author considers it possible that there may be more than one schistosome parasitizing cattle in the area, and advances some evidence to show that hybridization may be occurring naturally between *S. haematobium* and a cattle schistosome. These findings are discussed.

J. M. Watson

153—ROSENBERGER, G. & HEESCHEN, W., 1959. [Klinik für innere und chirurgische Rinderkrankheiten in Richard-Götzte-Institut der Tierärztlichen Hochschule, Hannover.] "Beitrag zur Behandlung des Lungenwurmbefalls der Rinder mit Cyanacethydrazid." *Deutsche Tierärztliche Wochenschrift*, **68** (7), 169-173. [English summary p. 173.]

A field trial of cyanacethydrazide for the treatment of lungworm in cattle is described. 408 animals were treated with the compound and 80 animals left untreated as controls. The cyanacethydrazide was given either orally at doses of 20 mg. per kg. body-weight as a 10% preparation or parenterally at doses of 17.5 mg. per kg. as a 15% solution. The maximum quantity of cyanacethydrazide given was 6 gm. per animal daily and no harmful side effects were observed. All the animals were examined before and from 12 to 16 days after treatment and it was shown that moderately affected animals could be clinically cured. Some of them showed, if not a complete cure as regards the passing of larvae, a definite reduction in number. The results of the treatment of seriously infected cattle was unsatisfactory.

K. Heath

154—SHARP, N. C. C., 1959. [Department of Hospital Pathology, University of Glasgow Veterinary School.] "Husk—the development of a vaccine." *Agriculture, London*, **66** (6), 241-245. Sharp recounts the basic facts relating to infection with *Dictyocaulus viviparus* in cattle and then reviews the history of the investigations carried out by the University of Glasgow Veterinary School team which culminated in the development of a method of active immunization by an oral vaccine of irradiated larvae.

J. M. Watson

155—SINGH, S. N., 1959. [Department of Parasitology, London School of Hygiene & Tropical Medicine, London.] "Adult specimens of *Stephanofilaria zaheeri* Singh, 1958 from buffaloes in Hyderabad." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **53** (1), 9.

Ear sores in buffaloes, in Hyderabad, are caused by *Stephanofilaria zaheeri* Singh, 1958. The female is larger than those of other species of the genus and has a distinct anus, while the male is characterized by the number and arrangement of its caudal papillae.

R. T. Leiper

156—VENKATARATNAM, A., 1959. [Veterinary College, Tirupati, India.] "Incidence of nasal schistosomiasis in buffaloes in Andhra Pradesh." *Indian Veterinary Journal*, **36** (5), 250-251. Venkataratnam examined 36 buffaloes in the Chittoor District. Ten of the animals examined showed the clinical symptoms of *Schistosoma nasalis*. 32 were found, on close examination, to carry this infection.

N. Jones

157—ZETTL, K., 1959. [Veterinäruntersuchungsamt Kassel.] "Lungenwurmbefall bei Rindern in Nordhessen und Vergleich verschiedener Behandlungsmethoden." *Deutsche Tierärztliche Wochenschrift*, **66** (12), 319-323. [English summary p. 323.]

Lungworm infections were observed following the importation of cattle into a district where the disease had been unknown for many years. The majority of animals infected were calves but on two farms infections amongst adult cows were seen. The treatment of both cows and calves was carried out using Cydrazin and Insol by subcutaneous injection at 5 ml. and 3 ml. per 50 kg. body-weight to a maximum dose of 30 ml. and 18 ml. respectively and antimosan by intravenous injection at 10 ml. per 50 kg. Sulphonamides or antibiotics were given to combat secondary infections. A general improvement of condition was found following treatment; coughing disappeared as early as the third to fourth day in some animals but in others it persisted for several weeks. Faecal samples were shown to be clear of larvae. The need for avoidance of further infection is stressed. The examination of faecal samples from newly purchased cattle is advised. Deer are regarded as a possible source of the spread of infection.

K. Heath

Sheep and Goats

See also Nos.: 32, 144, 228, 332, 350, 359, 387, 394, 396, 398, 408, 420, 421, 426.

158—ANDRLE, O., ERHARDOVÁ, B. & MÜLLER, K., 1958. [ONV Podbořany Biologický ústav ČSAV, parazitologie, Praha.] "Použití fenothiazinu v medicinálních lizech pro ovce." *Česko-slovenská Parasitologie*, **5** (1), 5-10. [German & Russian summaries p. 9.]

Andrle *et al.* treated 1,800 sheep with phenothiazine-mineral blocks. The composition of the blocks was: 3,460 gm. of sodium chloride, 3,000 gm. calcium sulphate, 765 gm. bone precipitate, 500 gm. magnesium oxide, 1,200 gm. silicic acid, 1,000 gm. phenothiazine, 20 gm. potassium iodide, 30 gm. cobalt chloride, 10 gm. copper chloride, 10 gm. manganese sulphate and 5 gm. fennel oil. Sheep carried heavy infections with *Trichostrongylus*, *Ostertagia*, *Haemonchus*, *Strongyloides*, *Cooperia* and *Chabertia*. They also carried lighter infections with *Dictyocaulus filaria*, *Müllerius capillaris* and *Protostrongylus rufescens*. The blocks were used at the approximate rate of 1 kg. per 100 sheep per day. The treatment continued for four months with interruptions at intervals of two to three weeks. The intensity of infection, as checked by coprological methods was reduced in lightly infected animals by 63% and in those with heavier infections by 42%. The treatment was conducted in conjunction with prophylactic measures reducing the chances of reinfection.

N. Jones

159—ANON., 1958. "Nematodirus disease: a parasitic disease of lambs." **Report. Northern Counties Animal Diseases Research Fund**, 18th (1958), 11 pp.

160—BAKER, N. F., LONGHURST, W. M. & DOUGLAS, J. R., 1957. "Experimental transmission of gastrointestinal nematodes between domestic sheep and Columbian black-tailed deer." **Transactions of the North American Wildlife Conference**, 22nd (1957), pp. 160-168. [Discussion pp. 166-168.]

Baker *et al.* conducted experiments with fawns of *Odocoileus columbianus* and lambs of a domestic breed of sheep. Lambs and fawns shown to be "essentially free of gastro-intestinal parasites" were used as test animals. Small groups of test animals were inoculated with either infective larvae obtained from culture of faeces from domestic sheep or infective larvae obtained from cultures of deer faeces. From evidence of worm egg counts and total worm counts the authors conclude that strains exhibiting "partial" host specificity exist among the gastro-intestinal nematodes common to both host species. The evidence for this is stronger in the case of *Ostertagia* spp. than for the species of *Trichostrongylus*. In the discussion which followed, the importance of the possibility of interchange of parasites between wild and domestic animals was stressed and examples were quoted.

H. D. Crofton

161—DECOTEAU, A. E., 1957. "Exogenous phases in the life cycle of *Nematodirus abnormalis*, a nematode parasitic in sheep." **Proceedings of the North Dakota Academy of Science**, 11, 23-26.

Decoteau obtained eggs of *Nematodirus abnormalis* by sieving faeces and also by grinding worms. The eggs were incubated at 30°C. Many of the eggs obtained from faeces did not develop beyond the six to eight-cell stage but some developed to give third-stage larvae after 18 days and hatching occurred between the 22nd and 26th day of incubation. All the eggs taken from worms developed to the infective stage, hatching being completed by the 15th day. The author suggests that the differences in development could be attributed to a temperature effect on the undeveloped eggs, the eggs from faeces being washed in water at temperatures as low as 10°C.

H. D. Crofton

162—FANKHAUSER, R., HINTERMANN, J. & VALETTE, H., 1959. [Abteilung für Vergleichende Neurologie der Veterinärambulatorischen Klinik, Bern.] "Coenurosis bei Schafen." **Schweizer Archiv für Tierheilkunde**, 101 (1), 15-32. [English, French & Italian summaries pp. 31-32.] Fankhauser *et al.* examined the brains of 83 sheep after having thoroughly observed the clinical symptoms which were exclusively of a psychological order. The symptoms were mainly galloping, running into walls and loss of balance. 89.1% of the brains showed macroscopical and microscopical changes due to coenuriasis. These included necrosis, haemorrhages and the presence of mesenchymatous reaction tissue. *Coenurus* cysts at all stages of development were found.

N. Jones

163—FEDERMANN, M., 1959. [Vetärmedizinischen Laboratorium der Farbenfabriken Bayer, W.-Elberfeld.] "Die Behandlung des Leberegelbefalles bei Schafen und Rindern mit Bilevon®." **Deutsche Tierärztliche Wochenschrift**, 66 (19), 526-529. [English summary p. 529.]

Federmann treated *Fasciola hepatica* infection with hexachlorophene. 911 sheep received 10 mg. to 20 mg. per kg. body-weight of the drug orally and 100 sheep received the same dose subcutaneously. Six weeks after administration of 15 mg. per kg. body-weight coprological examinations showed 89% of cures in the case of oral administration of hexachlorophene and 76.6% in the case of subcutaneous administration. In the latter case local inflammation appeared at the site of injection but disappeared after 14 days. Post-mortem examination proved that 100% cures had been obtained with 20 mg. per kg. 35 cattle received 10 mg. to 40 mg. per kg. orally with results similar to those obtained in the case of sheep. Toxic effects started at a dose level of 20 mg. per kg. and as a result of 40 mg. per kg. one animal out of 15 died. A dose of 15 mg. per kg. was effective against *Moniezia expansa*, but not against stomach and intestinal worms in 14 lambs. Eight days after treatment no more proglottides were found in the faeces but elimination of nematode eggs did not change. The author recommends 15 mg. to 20 mg. of hexachlorophene per kg. body-weight against *Fasciola hepatica* infection in sheep.

N. Jones

164—GEMMELL, M. A., 1958. "Hydatid disease in Australia. III. Observations on the incidence and geographical distribution of hydatidiasis in sheep in New South Wales." *Australian Veterinary Journal*, **34** (9), 269-280.

Gemmell examined 374,165 sheep in New South Wales and found 11.6% with liver cysts. The origin of 1,646 "lots" of sheep was established, and of these, 1,063 (64.3%) had infected animals. Infections on different properties varied from negative to 45%; 20.3% of the total properties had no infected sheep and 10.2% had a rate above 30%. The geographical distribution is discussed and correlated with the distribution of echinococcosis in dogs. The factors that may influence distribution include rate of stocking, husbandry practices, and climatic conditions. The effect of the latter on the eggs appears to be of primary importance. In districts where temperatures exceed 80°F. or rainfall is less than one inch per month or unfavourable conditions exist for more than six months of the year, a low incidence is postulated. The author concludes that the incidence and geographical distribution in New South Wales has not altered appreciably during the last 30 years and will probably remain constant as long as feeding raw offal to dogs is a common practice.

G. A. Webster

165—GIBSON, T. E., 1959. [Central Veterinary Laboratory, Weybridge, U.K.] "The development of resistance by sheep to infection with the nematodes *Nematodirus filicollis* and *Nematodirus battus*." *British Veterinary Journal*, **115** (4), 120-123.

Gibson carried out infection experiments with *Nematodirus filicollis* and *N. battus* on worm-free sheep ranging in age from eight to 89 weeks. He found that mature sheep possess little resistance to the establishment of the infection. They do, however, possess the power of inhibiting the development of the larvae so that fewer worms reach maturity than in the susceptible eight-week-old lamb, and of eliminating the greater part of the worm burden which initially becomes established. Previous infection appears to convey no significant immunity. The significance of these findings on the control and epidemiology of nematodiasis is discussed.

J. M. Watson

166—HIEPE, T., HEIDE, D. & LIPPMANN, R., 1959. [Medizinischen Tierklinik der Karl-Marx-Universität, Leipzig.] "Erfahrungen mit Cyanessigsäurehydrazid (CESH) in der Bekämpfung des Lungenwurmbefallen beim Schaf." *Berliner und Münchener Tierärztliche Wochenschrift*, **72** (16), 315-319. [English summary p. 319.]

The authors describe their experiences of the use of cyanacethydiazide in the treatment of lungworm infections in sheep. 1,592 sheep were treated with subcutaneous injections of a 2% solution at an average dosage of 15 mg. per kg. body-weight. Comparison of faecal counts, before and at 8, 14 and 20 days following treatment, showed in all but a few animals complete clearance of *Dictyocaulus* and a reduction in the number of *Protostrongylus* larvae.

K. Heath

167—JARRETT, W. F. H., JENNINGS, F. W., MCINTYRE, W. I. M., MULLIGAN, W. & SHARP, N. C. C., 1959. [University of Glasgow Veterinary School, Glasgow, Scotland.] "Studies on immunity to *Haemonchus contortus* infection—vaccination of sheep using a single dose of X-irradiated larvae." *American Journal of Veterinary Research*, **20** (76), 527-531.

The authors have assessed the degree of inactivation of *Haemonchus contortus* larvae following exposure to 10,000, 20,000, 40,000, 60,000 and 100,000 roentgens of X-rays. They have also examined the immunity produced in lambs given doses of 10,000 of these larvae and challenged after 117 days with 8,000 normal infective larvae. It was found that larvae subjected to 40,000 and 60,000 roentgens produced a good immunity to reinfection.

K. Heath

168—KASSAI, T., 1957. "Vizsgálatok a juhok gócos tüdőférgességről. IV. Rész. laboratóriumi módszerek juhok tüdőférgeinek életben való megállapítására." *Magyar Allatorvosok Lapja*, **12** (7/9), 226-231. [English & Russian summaries p. 231.]

There are two groups of methods for *in vivo* diagnosis of nodular verminous pneumonia and dictyocauliasis in sheep, those for isolation of larvae and immuno-diagnostic methods. The modified Baermann method seems to be the most useful and even better than the widely used drop method employed by Vajda. In the former the sheep droppings are put in a fine sieve which is placed in the mouth of a urine glass which is filled with water at 35°C. The larvae settle to the bottom of the glass in from one to one-and-a-half hours and are ready for

counting after removal with a pipette. The Vajda method depends on the fact that the *Dictyocaulus* larvae show positive hydrotaxis, and may therefore be isolated by placing fresh faeces in a concave slide with a drop of water on it. The isolation time is about 10-15 minutes. Although the Baermann method seems to be more reliable in mild cases of dictyocauliasis in sheep, the Vajda method is more useful in the case of heavy infections. Serological methods do not seem to be useful at present, on account of insufficient specificity but the complement-fixation and intradermal tests are promising.

H. Pogany

169—KASSAI, T., 1957. "Vizsgálatok a juhok gócos tüdőférgességéről. VI. Rész. Vizsgálat a *Cystocaulus ocreatus* pathogenitásáról." **Magyar Allatorvosok Lapja**, 12 (11), 333-337. [English & Russian summaries pp. 336-337.]

Nodular verminous pneumonia is still common in sheep, although control of *Dictyocaulus* infection has decreased this disease. Experimental sheep, free of any kind of lungworm and fed on good fodder, were infected with larvae of *Cystocaulus ocreatus* from *Helix obvia*, *H. pomatia* and *Cepaea vindobonensis*, approximately 1,000 larvae being used for each sheep. The experimental sheep showed loss of weight as compared with control animals, beginning on the 78th day. Faecal examination of the experimental sheep showed 30% negative for *Cystocaulus* infection on the 78th day and 57% negative on the 113th day. The intensity of the infection had also dropped from 63.5 larvae to 21.5 by the 113th day. Good fodder in the case of four-month-old sheep infected with *C. ocreatus* is of great importance in the prevention of any type of pneumonia, but does not give sufficient resistance alone. Weight gains became less between 60 to 80 days after infection. This coincides with the first period of sexual activity of the sexually mature *Cystocaulus*.

H. Pogany

170—KASSAI, T. & HOLLÓ, F., 1957. "Vizsgálatok a juhok gócos tüdőférgességéről. V. Rész. A hazai juh-tüdőférgek 1. lárváinak differenciál-diagnózisa." **Magyar Allatorvosok Lapja**, 12 (7/9), 232-234. [English & Russian summaries p. 234.]

Dictyocaulus filaria, *Cystocaulus ocreatus*, *Protostrongylus rufescens*, *Müllerius capillaris* and *Neostrongylus linearis* are the species of lungworm known in sheep in Hungary. Kassai & Holló present an improved key for the determination of lungworm larvae from sheep in Hungary. They point out that unsheathed larvae in freshly evacuated sheep droppings can only be those of lungworms or *Strongyloides*. *Strongyloides* larvae, however, are shorter and thicker than those of *Protostrongylus* and other lungworms and their motion is typically spiral. Faecal specimens for examination must be absolutely fresh.

H. Pogany

171—KASSAI, T. & HOLLÓ, F., 1958. [Vysoká škola veterinární, Budapešť.] "Klíč k určování larev I. stadia plícních červů přežívákův." **Ceskoslovenská Parasitologie**, 5 (2), 95-99.

Kassai & Holló comment on the diagnostic keys for first-stage larvae of lung parasites in ruminants. They refer to the work of Šubkinova (1939), Terent'eva-Markova (1951), Gerichter (1950), Hovorka (1954), Shults & Boev (1940) and some other authors. The authors are of the opinion that it is not correct to base the diagnosis of *Protostrongylus* first-stage larvae on their dimensions and on the morphological differences in the tail. Gerichter's key is said to be basically good, but he did not pay sufficient attention to the structural characteristics of different species. Differential diagnoses, based on the body length, the form of the tail and the structural differences are given of the first-stage larvae of: *Dictyocaulus filaria*, *Protostrongylus rufescens*, *Protostrongylus* spp., *Müllerius capillaris*, *Cystocaulus ocreatus* and *Neostrongylus linearis*.

N. Jones

172—MOHI-UD-DIN, G., 1959. [Department of Animal Husbandry, J & K Srinagar, Kashmir.] "Preliminary trials with 'Dictycide' (I.C.I.) against lung worm disease in sheep and goats." **Indian Veterinary Journal**, 36 (7), 335-337.

Sheep infected with *Dictyocaulus filaria* and *Protostrongylus rufescens* were used in a field trial to compare the efficacy of Dictycide with Lugol's iodine and antibiotic treatment. 0.8 to 2.5 ml. of Dictycide were given twice, with an interval of three weeks, by subcutaneous injection. Lugol's iodine (2-3 c.c.) and antibiotics in the usual dosages were given by intra-tracheal injection. A marked improvement was seen following Dictycide. Respiratory distress, coughing

and bronchial discharge were lessened but some animals continued to void eggs in these discharges. Further trials are to be conducted revising the dosage to three consecutive daily doses.

K. Heath

173—MOTTL, S. & PÁV, J., 1958. [Výzkumný ústav lesa a myslivosti ČSAZV, Zbraslav.] "Muflon jako hostitel motolice jelení, *Paramphistomum cervi* (Schrank, 1790)." **Československá Parasitologie**, 5 (1), 153-155. [English, German & Russian summaries p. 154.]

Mottl & Páv found *Paramphistomum cervi* in two out of 45 *Ovis musimon* examined post mortem, 77 parasites being present in one case and 12 in the other. The mouflons were kept in a deer park with red deer and fallow-deer.

N. Jones

174—OLLERENSHAW, C. B. & ROWLANDS, W. T., 1959. [Ministry of Agriculture, Fisheries & Food, Central Veterinary Laboratory, New Haw, Weybridge, U.K.] "A method of forecasting the incidence of fascioliasis in Anglesey." **Veterinary Record**, 71 (29), 591-598.

Ollerenshaw & Rowlands studied the incidence of fascioliasis in Anglesey in relation to meteorological data over the period 1948-57. Infections causing acute fascioliasis are described as "summer" and "winter" infections. Losses from this disease due to the summer infection usually began in October and continued throughout the winter into early spring. These losses were more important than those resulting from the winter infection. They were found to be directly related to the ΣM_t of May to October inclusive with the maximum value at $\Sigma M_t = 500$. (M_t is an index obtained by multiplying together moisture, as indicated by difference between rainfall and transpiration, and the number of days when more than 0.2 mm. of rain falls in the 24 hours, and adjusting the product so obtained to allow for variations in temperature.) Losses among sheep, caused by acute fascioliasis due to the winter infection commenced in July and ceased in October or November. They were in direct relation to the ΣM_t of August, September and October in one year and May and June of the next. $\Sigma M_t = 300$ was the point at which losses from acute fascioliasis commenced. It was observed that the infection reached maturity in the snail when ΣM_t reached 280 and that numbers of metacercariae remained alive for at least three months. Losses usually commenced two months after the initial infection of the herbage. The authors consider that, while this method of assessing the effect of climate on the development of the parasite is not infallible, there is sufficient correlation between incidence and meteorological data so codified over the ten-year period between 1948 and 1957 to enable a reliable method of forecasting the incidence of the disease to be made. This would be of use in improving the present measures for disease control.

N. Jones

175—PARRY, J. A., 1959. [Bishop House, Brecon, South Wales.] "Intramuscular carbon tetrachloride in the treatment of acute fascioliasis in sheep." [Correspondence.] **Veterinary Record**, 71 (26), 536-537.

Parry found 4 ml. of carbon tetrachloride suspended in 50% of medicinal paraffin, injected intramuscularly to be the optimum dose in treatment of acute fascioliasis in sheep. From September 1958 to February 1959, 7,400 sheep were treated in this way. As a result in flocks threatened with this disease deaths ceased 12 hours after treatment. During the first half hour transient lameness and accelerated pulse were observed as side effects. The writer suggests that it is beneficial to repeat the treatment after 21 days.

N. Jones

176—SCHANZEL, H., 1958. [Katedra parazitologie invazních chorob veterinární fakulty Vysoké školy zemědělské, Brno.] "Resistance různých vývojových stadií plícních a střevních hlistic ovcí." **Československá Parasitologie**, 5 (2), 153-155.

Schanzel used 0.03 gm. of calcium cyanamide in 2 ml. of water per 15 sq. cm. petri dish containing nematode larvae in sheep faeces. This was lethal within 3-6 hours to the first-stage larvae of *Haemonchus contortus*, *Chabertia*, *Oesophagostomum*, *Bunostomum* and *Ostertagia*. The second-stage larvae of these parasites as well as the first-stage larvae of *Strongyloides papilliferus* and *Trichostrongylus* died after 9 and 12 hours exposure; while the second-stage larvae of the last two parasites died after 12-15 and 15-18 hours respectively. The third-stage larvae of the first five species died between 15 and 18 hours after application of the calcium

cyanamide. Those of *Strongyloides* died after 18-21 hours and of *Trichostrongylus* sp. after 21-24 hours. With *Dictyocaulus filaria*, first-stage larvae were all dead after 18 hours and second-stage larvae after 39 hours, while third-stage larvae died after 54 hours. Only 13% of the control larvae died within 48 hours.

N. Jones

177—STAMPA, S., 1959. "The control of internal parasites of sheep with Neguvon and Asuntol. A preliminary report." *Journal of the South African Veterinary Medical Association*, 30 (1), 19-26.

A report is given on anthelmintic experiments carried out on 2,152 sheep and five goats, using Neguvon and Asuntol. Both drugs were found to be effective against *Haemonchus* and *Nematodirus*. In addition Asuntol was effective against *Ostertagia*, *Trichostrongylus*, *Strongyloides* and *Oesophagostomum*. Neguvon may possibly be effective against the latter. *Dictyocaulus filaria* was also affected by the treatment. Using a mixture of ten parts Neguvon to one part Asuntol, after pre-dosing with copper sulphate, 50-60 mg. per kg. body-weight was found to be an effective dosage rate at which no toxic effects were recorded from sheep. At 90 mg. per kg. three out of five goats died, but five sheep dosed at the same rate showed no symptoms. Sheep in the winter rainfall area of the Cape were more susceptible to the toxic effects of the mixture than those in the Karoo.

D. Mettrick

178—WILSON, A. L., 1959. [West of Scotland Agricultural College.] "Liver fluke disease in sheep." *Scottish Agriculture*, 39 (2), 106-107.

Wilson briefly reviews from the practical standpoint the life-cycle of the liver-fluke, the symptoms and types of the disease, and the methods of control by snail eradication and by dosing the sheep.

J. M. Watson

179—ZDUN, V. I., 1959. [Nauchno-issledovatelski institut zemledeliya i zhivotnovodstva zapadnikh raionov Ukrainskoi SSR, Lvov.] [The hibernation of larval forms of the liver fluke, *Fasciola hepatica*, in a snail.] *Zoologicheski Zhurnal*, 38 (8), 1258-1259. [In Russian: English summary p. 1259.]

Mature cercariae of *Fasciola hepatica* were found in three of 135 *Galba truncatula* collected on a very damp pasture near Lvov, immediately after the thawing of snow in the middle of April 1956. Thus when the snails emerge from hibernation the cercariae infect the pastures even before the animals are put out to graze.

G. I. Pozniak

Pigs (Swine)

See also Nos.: 111, 228, 375, 387, 409, 410, 411.

180—GUTHRIE, J. E., & BRIGGS, J. E., 1957. "Ascaricidal activity of piperazine administered in the feed to swine." *Journal of Animal Science*, 16 (4), 943-945.

A group of 81 pigs known to be infected with *Ascaris lumbricoides* were treated with piperazine sulphate, piperazine dihydrochloride or piperazine phosphate to determine the comparative efficacy of the preparations. The drugs were administered at different dose levels in the feed, without prior starvation, over a period of 24 hours. Total faeces from each animal were examined for ascarids during a seven-day post-treatment period. The pigs were then killed and the gut examined for worms. Drug efficiency was calculated on the percentage of ascarids eliminated. At dose levels of 50-55 mg. per lb. body-weight of basic piperazine, clearance rates of 92.4% to 100% were obtained. At dose levels of 30-40 mg. per lb., clearance rates were lower or less reliable. There was no significant difference in anthelmintic efficiency between the three preparations.

O. D. Standen

181—KELLEY, Jr., G. W., SUMPTION, L., ADAMS, J. & OLSEN, L. S., 1959. [Departments of Animal Pathology and Animal Husbandry, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Treatment of dams to reduce *Ascaris suum* infections in baby pigs." *Veterinary Medicine*, 54 (12), 573-576.

Sows fed hygromycin B during the gestation period were passing three *Ascaris suum* eggs per gm. of faeces (e.p.g.) one month before farrowing as compared to 610 e.p.g. passed by untreated, but similarly maintained, controls. All sows were placed on new pasture lots

for farrowing. Under the conditions of this experiment, there was no substantial reduction in the infection of progeny from treated sows; 43 out of 54 were passing eggs as compared with 48 out of 50 control pigs at the end of the experiment. Nor were the number of pigs farrowed and their daily weight gains significantly different. The average e.p.g. was 530 and 1,900 respectively, but this result was not confirmed at necropsy of 19 pigs from both groups, all of which harboured *A. suum* (an average of 24 worms per animal). G. I. Pozniak

182—KOVÁCS, F. & NEMESÉRI, L., 1957. "Sertések májmétykórjának orvoslása intramuscularisan adott széntetrakloriddal." *Magyar Allatorvosok Lapja*, **12** (11), 337-340. [English & Russian summaries p. 340.]

Porcine fascioliasis occurs on pastures through eating grass carrying encysted cercariae and by drinking water containing infected intermediate hosts. Mild infections are symptomless but heavy infection causes loss of appetite and diarrhoea. On the 12th day after intramuscular administration of carbon tetrachloride and paraffin in equal parts at the rate of 1.0 ml. carbon tetrachloride per 10 kg. body-weight, faecal examination was negative. The bromsulphalein test showed no functional damage to the liver from carbon tetrachloride. In a control experiment using sheep Distol, living flukes were still found in the liver after two weeks' treatment.

H. Pogany

183—POWERS, K. G., TODD, A. C. & GOLDSBY, A. I., 1959. "Swine whipworm in Wisconsin." *Veterinary Medicine*, **54** (8), 396-397.

A survey was conducted between September 1956 and March 1957 of *Trichuris suis* infections in different age groups of pigs in Dane County, Wisconsin, U.S.A. The rate of infection in the most susceptible group (aged 8 to 24 weeks) was 75.5% and was in direct contrast to that of 13.9% reported by a previous survey for market-weight swine. Acquired immunity in older pigs can mask the actual prevalence of trichuriasis. G. I. Pozniak

184—RAY, J. D., 1959. "Respiratory problems in swine." *Journal of the American Veterinary Medical Association*, **134** (8), 357-361.

Ray mentions ascarids and lungworms among other causes of respiratory diseases in swine. The latter can be serious especially since the lungworm larvae are implicated as vectors of swine influenza and hog cholera and lungworms are more prevalent than is realized. N. Jones

185—SINGH, S., 1959. [Parasitology Section, Punjab College of Veterinary Science and A. H., Hissar.] "Common parasites of pigs in Delhi." *Indian Veterinary Journal*, **36** (2), 84-85.

Singh examined the intestines of 30 pigs slaughtered in Delhi. *Ascaris lumbricoides* was found in 15 and *Macracanthorhynchus hirudinaceus* in nine. S. Willmott

186—STEFANSKI, W., MAJDAN, S. & WERTEJUK, M., 1959. [Zakład Parazytologii Instytutu Weterynaryjnego, Puławy, Warszawa, Poland.] "Research on helminths as possible vectors of hog cholera." *Bulletin de l'Académie Polonaise des Sciences. Classe II. Série des Sciences Biologiques*, **7** (4), 143-146.

The hog cholera virus was shown not to be transmitted within ascarid eggs when these were obtained from animals with the fever and were then given to pigs orally in the infective stage or subcutaneously as a ground suspension. When infective *Strongyloides papillosus* larvae were applied to the undamaged skin of susceptible pigs together with virus contaminated urine or blood, one out of 15 pigs developed hog cholera when urine was used and two out of three when blood was used. Therefore under some conditions (probably high virus concentration), *Strongyloides* larvae may be instrumental in transmitting hog cholera. Further experiments indicated that infection with intestinal worms has no adverse effects on the development of immunity against hog cholera in pigs inoculated with the CV [crystal violet?] vaccine. G. I. Pozniak

187—WEIDE, K. D. & TWIEHAUS, M. J., 1959. [Department of Veterinary Science, Ohio Agricultural Experiment Station, Wooster, U.S.A.] "Hematological studies of normal, ascarid-infected, and hog cholera-vaccinated swine." *American Journal of Veterinary Research*, 20 (76), 562-567. Weide & Twiehaus found that pigs experimentally infected with ascarid eggs developed a mild anaemia that was noticeable 32 days after infection. Circulating eosinophils increased four days after infection, reached a peak by the 16th day, and returned to normal levels within 28 days. The mild leucopenia which developed following both vaccination and challenge with rabbit-modified hog cholera vaccine both existed longer and was slower in returning to normal in ascarid-infected than in control animals.

J. M. Watson

Elephants

See No. 223.

Camels and Llamas

188—ZAVADIL, R., 1957. [Katedra parazitologie veterinární fakulty, Brno.] "K problému adaptativní schopnosti cizopasných červů na různé hostitele." *Československá Parazitologie*, 4, 369-373. [German & Russian summaries pp. 372-373.]

Zavadil reports on two cases of adaptation of helminth species to different host species. In one case a Bactrian camel in good condition was infected with *Dictyocaulus*, *Chabertia*, *Trichuris* and *Capillaria bovis* from mouflons, while in the other case another Bactrian camel, suffering from rachitism, was infected with *Dictyocaulus*, *Chabertia* and *Nematodirus* from sheep. Clinical symptoms appeared in the second case two months after the supposed time of infection, whereas in the first case they appeared only after 14 months.

N. Jones

Rabbits and Hares

See also Nos.: 91, 405.

189—BESCH, E. D., 1959. [Department of Veterinary Parasitology, College of Veterinary Medicine, Oklahoma State University, Stillwater, U.S.A.] "Demonstration of the nymph of *Linguatula serrata* Fröhlich, 1789 in *Sylvilagus floridanus* from north central Oklahoma." *Journal of the American Veterinary Medical Association*, 134, (12), 544-545.

Besch reports that he found a nymph of *Linguatula serrata* in a cotton-tail rabbit (*Sylvilagus floridanus*) collected from the grassland area south of Pawhuska. This is a first record for Oklahoma. The importance of studying the distribution and abundance of this species in the U.S.A. in both intermediate and definitive hosts (especially fox and coyote) is stressed.

J. M. Watson

190—ERHARDOVÁ, B., 1957. [Biologický ústav ČSAV, parazitologie, Praha.] "K problému hostitelské specificity některých druhů červů z čeledi Trichostrongylidae." *Československá Parazitologie*, 4, 121-129. [German & Russian summaries pp. 127-128.]

Erhardová found *Trichostrongylus retortaeformis* in *Ondatra zibethica*, *Microtus arvalis*, *Sciurus vulgaris* and *Citellus citellus* from areas frequented by *Lepus europaeus* and *L. timidus* which commonly harbour *T. retortaeformis* in Czechoslovakia. The incidence of infection in the two *Lepus* spp. reached 95% but that of the other hosts was low, except for *C. citellus* of which 19% were infected. In unusual hosts only a small percentage of parasites developed to the adult stage. Morphological and dimensional differences were also noted, with the exception of the worms recovered from *M. arvalis*, in which body dimensions alone differed. The authors infected white mice, guinea-pigs and a rabbit with *T. retortaeformis* larvae. In white mice the larvae remained alive for more than 19 days. Eggs in the faeces of guinea-pigs and the rabbit were found within 14 to 16 days of infection. However, only a small number of larvae developed to maturity in guinea-pigs, whereas in the rabbit adults were numerous. The author also reports on the finding of *Ostertagia circumcincta* and *O. trifurcata* from *Marmota baibacina*, brought by Ryšavy from China.

N. Jones

Cats and Dogs

See also Nos.: 1, 40, 90, 91, 164, 229, 230, 355, 359, 362, 363, 387, 392, 397, 409, 418.

191—COLGLAZIER, M. L., WILKENS, E. H. & CHESTER, D. K., 1959. [Animal Disease and Parasite Research Division, Agricultural Research Service, U.S. Dept. Agriculture, Beltsville, Md, U.S.A.] "Action of piperazine against mixed infections of *Ancylostoma caninum* and *Uncinaria stenocephala* in dogs." *Proceedings of the Helminthological Society of Washington*, **26** (1), 8-10.

A group of 16 dogs ranging from three weeks to one year of age were experimentally infected with *Uncinaria stenocephala* and subsequently allowed to run on ground contaminated with infective stages of *Ancylostoma caninum*. When infection was confirmed the animals were given piperazine citrate or piperazine sulphate in hard gelatin capsules. The dosage given was, 25, 50, 75 or 100 mg. per lb. body-weight. The activity of piperazine against *Uncinaria* was variable even at the higher dose levels and was poor against *Ancylostoma* at all dose levels. Vomiting occurred in some of the dogs, especially those given the bigger doses. It is concluded that the usefulness of piperazine against hookworm is limited to the treatment of *Uncinaria* infections.

O. D. Standen

192—DORRINGTON, J. E., 1959. "The treatment of *Filaroides osleri* infestation with Dictycide." *Journal of the South African Veterinary Medical Association*, **30** (1), 27.

Six dogs infected with *Filaroides osleri* were treated with Dictycide at a dosage rate of 1 gm. per 10 lb. body-weight. This was repeated for three consecutive days. Four dogs were cured after two doses; another required a second course of treatment three weeks later. The sixth was treated for five consecutive days, this also being repeated in three weeks. This dog was finally destroyed because of epileptiform fits but had, meanwhile, shown considerable improvement. Although Dictycide did not produce a complete cure in this last-mentioned case, the cough was relieved, and the animal returned to show condition. Lauder's suggestion that lateral X-ray of the chest gives a rapid method of diagnosis was confirmed. D. Mettrick

193—EHRENFORD, F. A., NAPIER, R. & ESHENOUR, R. W., 1959. "Clinical diagnosis of canine whipworm infection." *Veterinary Medicine*, **54** (10), 513-516.

Ehrenford *et al.* examined the faeces of 2,318 randomly selected dogs of mixed breeds from the Ohio River Drainage Basin, using sodium dichromate solution of specific gravity 1.36. An incidence of 56% for *Trichuris vulpis* and 9.2% for *Capillaria* spp. (including *C. aerophila*, *C. felis-cati* and *C. plica*) was found. In dog faeces capillarid eggs are easily confused with whipworm eggs, which appears to be a common cause of apparent failures in treatment with phthalofyne (Whipcide). Capillarid eggs are readily differentiated by the fact that they are of approximately the same length as those of *Ancylostoma caninum*, in contrast to the eggs of *T. vulpis*, which are appreciably longer.

J. M. Watson

194—HOLLIMAN, R. B., 1959. [Department of Biological Sciences, Florida State University, Tallahassee, Florida, U.S.A.] "An anomaly in the genitalia of *Dipylidium caninum*." *Journal of Parasitology*, **45** (2), 238-239.

A single abnormal proglottis was found among six complete live specimens of *Dipylidium caninum* removed from a dog in Florida. The proglottis contained, in addition to the normal complement of genitalia, a third genital complex in which the vitelline gland, oötype and Mehlis' gland were missing and the vagina ended blindly in a lateral depression on the ovary. The organs in the anomalous genitalia were smaller than the corresponding organs in the normal complex.

G. I. Pozniak

195—ISHII, T., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Studies on larva migrans. 1. On the stage of the infective dog Ascaris larvae.] *Japanese Journal of Parasitology*, **8** (2), 204-208. [In Japanese: English summary p. 208.]

The moultling of larvae of *Toxocara canis* and morphological details associated with it were studied. Larvae were infective at the second stage which appeared on the tenth to fourteenth day of culture, when moultling took place inside the egg capsule.

M. Yoshida

196—ITO, J., WATANABE, K., NOGUCHI, M., MOCHIZUKI, H. & MAEKAWA, T., 1959. [Hygiene Laboratory, Faculty of Education, Shizuoka University, Japan.] [An investigation of the helminth parasites of dogs in Shizuoka Prefecture. 2. *Toxocara canis* and *Ancylostoma caninum*.] **Japanese Journal of Parasitology**, 8 (1), 13-18. [In Japanese: English summary p. 18.] In Shizuoka, dogs were infected by *Toxocara canis* and *Ancylostoma caninum* at a rate of 6.8% and 84.9%, respectively. *T. canis* was found at a higher rate in young dogs (less than one year old). In the case of *A. caninum*, a lower rate of infection and a smaller number of worms per dog were found in winter than any other season. Reliability of stool examination was 46.6% for *T. canis* and 97.8% for *A. caninum*. M. Yoshida

197—ITO, J., WATANABE, K., NOGUCHI, M., MOCHIZUKI, H. & MAEKAWA, T., 1959. [Hygiene Laboratory, Faculty of Education, Shizuoka University, Japan.] [An investigation of the helminth parasites of dogs in Shizuoka Prefecture. 3. *Trichuris vulpis*, *Dirofilaria immitis* and *Spirocera sanguinolenta*.] **Japanese Journal of Parasitology**, 8 (2), 155-159. [In Japanese: English summary p. 159.] The correlation indices between the infection rates of *Trichuris vulpis* and *Dirofilaria immitis* and the age of dogs infected were +0.5 and +0.7, respectively, the rate being higher than 30% in both. *Spirocera lupi* was found in three dogs out of 192 examined. M. Yoshida

198—KERSTEN, W., 1959. [Das Veterinär-Parasitologische Institut der Justus-Liebig-Universität, Giessen.] "Zum Vorkommen der Herzfilarie (*Dirofilaria immitis*) beim Hund in Deutschland." **Deutsche Tierärztliche Wochenschrift**, 66 (8), 217-219. [English summary p. 219.] Kersten reports *Dirofilaria immitis* infection in a chow bitch imported into Western Germany from Florida by an American officer. He describes the diagnosis, pathology and the histological findings at post-mortem, but points out that conditions in Germany are not favourable for the mosquito intermediaries and that indigenous infections are unlikely. A. E. Fountain

199—KÖHLER, H., 1959. [Institut für Pathologie und Gerichtliche Tierheilkunde der Tierärztlichen Hochschule, Wien.] "Cysticercose des Gehirnes beim Hund." **Deutsche Tierärztliche Wochenschrift**, 66 (18), 509. Köhler reports on a dog which appeared clinically healthy but died after sudden spasms. As well as pathological changes in other organs, autopsy revealed numerous specimens of *Cysticercus cellulosae* in the brain. N. Jones

200—LE ROUX, P. H., 1959. "‘Dictycide’ as moontlike behandeling vir *Filaroides osleri*." **Journal of the South African Veterinary Medical Association**, 30 (1), 40. [English summary p. 40.] Le Roux reports the successful treatment of *Filaroides osleri* infection in a dog using Dictycide at a dosage rate of 1.0 c.c. per 35 lb. body-weight. D. Mettrick

201—OLSEN, O. W. & BRACKEN, F. K., 1959. [Department of Zoology, Colorado State University, Fort Collins, Colorado, U.S.A.] "Lungworm, *Filaroides osleri*, in a dog in Colorado." **Journal of the American Veterinary Medical Association**, 134 (7), 330-334. The post-mortem examination of a dog which died from poisoning revealed verminous bronchitis caused by *Filaroides osleri* many of which were found in lesions near the bifurcation of the trachea. The dog had been dyspnoeic and had coughed for three years. The authors review the instances of filaroidiasis (osleri). Symptoms appear to be a chronic cough, vomiting after coughing, respiratory difficulties ranging from slight to severe and emaciation in some cases. Stibophen given as twelve weekly doses of 5 ml. for a dog weighing 30-45 kg. by injection and diethylcarbamazine citrate given orally three times a day for a week in 10 mg. quantities together with 1.5-2.0 ml. of stibophen were effective treatments. Faecal examination was not reliable for diagnosis but swabs of the trachea were recommended. K. Heath

202—REAY, R., 1958. [G.H.Q. Far East Land Forces, Singapore.] "Fight for fitness." **British Veterinary Journal**, 114 (7), 272-273. Reay describes the measures taken to control an epidemic of heartworm among dogs of the Army Guard Dog Unit at Singapore. *Mansonia uniformis* was shown to be the vector. J. M. Watson

203—WINTER, H., 1959. [Veterinary School, University of Queensland, Yeerongpilly, Brisbane, Australia.] "The pathology of canine dirofilariasis." *American Journal of Veterinary Research*, **20** (75), 366-371.

Winter reviews earlier literature on the life-histories and vectors of *Dirofilaria immitis* and related species found in dogs, including *Dipetalonema reconditum* and comments on the lack of studies of the pathology of heartworm infections. Heartworms were found in about 10% of dogs autopsied at the University of Queensland Veterinary School and Winter's study of the pathology is based on full histological records of 12 of these. Adult worms were found in the heart and lesions were found in the lungs, lymph nodes, spleen and liver. When worms were numerous in the heart, well developed changes were always found in the lungs and lymph nodes. Outstanding lesions apparently related to the clinical symptoms were: in the lungs, haemosiderosis, thrombosis, chronic inflammation, fibrosis and moderate emphysema; in the lymph nodes, haemosiderosis and phagocytosis of erythrocytes by macrophages; in the spleen, haemosiderosis; in the liver, passive venous and, in advanced cases, lymphatic congestion with relatively little haemosiderosis. These lesions are discussed in detail with four photomicrographs. Ascites and anasarca were also found being probably due, like the circulatory disturbances, to pulmonary fibrosis and emphysema. The lesions and their relation to the clinical signs indicated that the worms do not produce a toxin, the haemosiderosis and lung inflammation being probably due to digestion of the adult worms. G. Lapage

204—YARBOROUGH, J. H., DOTY, L. T., BECKER, F. E., HAGGARD, J. & BEUSSE, D. O., 1959. [Miami, Florida, U.S.A.] "Micro *Dirofilaria immitis* in the dog." *Veterinary Medicine*, **54** (7), 366.

Yarborough *et al.* treated ten dogs for *Dirofilaria immitis* infection with 10 mg. of Dizan premix per pound body-weight in the food for 15 days; the Dizan premix was given 15 days after a three-day treatment with 0.2 c.c. of caparsolate sodium per pound body-weight. Following treatment repeated examination showed no microfilariae in the dogs. Further experiments with Dizan premix are being conducted. Occasional loose stools were the only side effects noted while using the above drug. N. Jones

Fur-Bearing Animals

See also Nos.: 111, 355, 358, 362, 369.

Laboratory Animals

See also Nos.: 49, 91, 111, 190, 346, 355, 359, 365, 369, 381, 382, 383, 388, 390, 400, 403, 412.

205—JELEN, P., 1957. [Kontrolní ústav farmaceutický, Praha.] "Účinek některých anthelmintik proti *Hymenolepis fraterna* u bílých myší—emetin jako účinné anticestodikum." *Československá Parasitologie*, **4**, 167-174.

Jelen treated natural *Hymenolepis fraterna* infection in white mice and found the following drugs useful: benzine, carbon tetrachloride, gentian violet, atebrin, emetine and potassium antimony tartrate. The efficacy of emetine was enhanced by using it with atebrin. N. Jones

206—OLSON, L. J., 1959. [The University of Texas Medical Branch, Galveston, Texas, U.S.A.] "The survival of migratory and post-migratory stages of *Litomosoides carinii* in white rats." *Journal of Parasitology*, **45** (2), 182-188.

2,000 *Litomosoides carinii* were inoculated subcutaneously, as third-stage larvae, into eleven white rats, and 3,000 *L. carinii* into 14 cotton-rats. The rats were killed 7 to 45 days after inoculation. 2% of the inoculated worms were recovered from the white rats and 42% from the cotton-rats. Third and fourth-stage larvae and young adult worms were transferred from cotton-rats in which they had developed for 7, 17 and 26 days respectively, to the peritoneal cavity of white rats and cotton-rats. The survival, development and growth of the worms which had been transferred to white rats were approximately as good as those which had

been transferred to cotton-rats, and of worms which had been left in their original cotton-rats. In further experiments in which larvae were transferred to white rats, the worms attained sexual maturity at about the same time as worms in cotton-rat infections, and produced microfilariae which developed normally in mites. The survival of the worms, especially the females, was, however, less in white rats than in cotton-rat infections, and encapsulation was common in white rats but rare in cotton-rats. It is concluded that resistance to migration is the most critical phase in the survival of the parasite in white rats, although resistance continues after this phase.

W. A. F. Webber

207—SEGARRA, J. M., JONES, A. W. & WYANT, K. D., 1959. [The University of Tennessee, Knoxville, Tenn., U.S.A.] "Presumed hatching of taeniid eggs in the livers of rats." *Journal of Parasitology*, 45 (2), 237.

A known number of *Hydatigera taeniaeformis* eggs were carefully injected into the large liver lobe of rats. Subsequently larval cysts were found in all operated animals, but their number was only about 5% of those present in controls. Embryos from predigested eggs established themselves more readily than from untreated ones. Three explanations are tentatively offered for these results. Two are considered to be unlikely, namely that the rats have become accidentally infected by the normal route and that the injected eggs happened to reach the bile passages and hence the intestine. The third possibility is that enzymatic action occurs in the liver, causing the dissolution of the embryophore but failing to destroy the embryo. This hypothesis remains to be tested by *in vitro* and *in vivo* experiment.

G. I. Pozniak

208—TOMIMURA, T., 1959. [Department of Veterinary Science, College of Agriculture, University of Osaka Prefecture, Sakai, Osaka, Japan.] [Experimental studies on paragonimiasis. 1. Intraperitoneal infection of rats with young adults of *Paragonimus iloktsuenensis* (Chen, 1940) and its egg production in early stages of infection.] *Japanese Journal of Parasitology*, 8 (2), 278-293. [In Japanese: English summary pp. 292-293.]

The author succeeded in implanting any predetermined number of young *Paragonimus iloktsuenensis* into the peritoneal cavity of experimental rats. Cysts appeared in the lung, following implantation of more than two worms. The implanted worms migrated once or twice, forming the second or third cyst. Variation in the number of eggs found in the faeces coincided in time with the cycle of cyst formation.

M. Yoshida

Poultry

See also Nos.: 379, 415, 426.

209—GUTIÉRREZ, R. O., 1958. [Técnico del Instituto de Patología Animal, Argentina.] "Larvas de *Phyocephalus sexalatus* (Molin, 1860) enquistadas en el intestino del pato doméstico." *Revista de Investigaciones Ganaderas*, Buenos Aires, No. 3, pp. 33-38. [English summary p. 38.] Post-mortem examination of a duck showed small nematode cysts in the external walls of the gut especially the small intestine. These proved to be third-stage larvae of *Phyocephalus sexalatus*. This probably represents a case of accidental parasitism.

W. K. Dunscombe

210—MALHEIRO, D. DE M., & CAMPOS, M. S. DE, 1957. [Universidade de São Paulo, Departamento de Zoológia Médica e Parasitologia, Brazil.] "Ação do tetracloreto de carbono (CCl_4) contra *Ascaridia galli* (Schrank, 1788) Nematoda Ascaridinae." *Revista da Faculdade de Medicina Veterinária*, São Paulo, 6 (1), 71-76. [English summary pp. 75-76.]

Malheiro & Campos infected two groups of 15 and 19 chicks respectively with an average dose of 135 *Ascaridia galli* eggs per bird. A third group of chicks was given 200-250 *A. galli* eggs per bird. The chicks of the first and second groups received a daily dose of 1 ml. and 0.5 ml. of carbon tetrachloride respectively by intubation through 5 consecutive days. The birds of the third group similarly received a single dose of 2 ml. of the drug. The same numbers of birds were used in the corresponding control groups. Icterus and liver lesions were observed as side effects in the first two groups but no side effects occurred in the third

group. In the first group, only one parasite was found from all birds as compared with 7-61 worms per individual in the control group. The mean numbers of worms, recovered from the second treated and control groups were 12.62 and 15.95 respectively. The difference between the two mean numbers is expressed statistically as $P=0.05$ (formula of Northam & Rocha). At autopsy of the third group of birds two chicks revealed the presence of one parasite each and one had two parasites, the remainder being free, as compared with 1-17 worms in each individual of the control group.

N. Jones

211—PANDE, P. G. & KRISHNAMURTY, D., 1959. [Department of Pathology, U.P. College of Veterinary Science & Animal Husbandry, Mathura, India.] "Inter-relationship between hypovitaminosis A and *Ascaridia galli* infestation in poultry." *Poultry Science*, 38 (1), 13-25.

Pande & Krishnamurty conducted three experiments concerning the interrelationship of hypovitaminosis A and *Ascaridia galli* infection in poultry. The basic ration consisted of grain and mash with a vitamin A content of 365 I.U. per kg. of feed. Green feeds were given separately. It had already been observed that the incidence of infection with *A. galli* was directly related to the number of cases of hypovitaminosis A and inversely related to the amount of green feed supplied. In the first experiment two groups of 30 four-month-old chickens were used, Group A received five minims of chenopodium oil per bird: group B received no anthelmintic treatment. Both groups received the basic ration plus 2 oz. of green feed per bird daily. The birds were naturally infected with *A. galli*. During the first eight weeks of the experiment four chickens of the first group died—two from hypovitaminosis and one from ascaridiasis. During the same period eleven birds died from Group B. In all these cases lesions due to vitamin A deficiency were fairly extensive and the number of ascarids recovered ranged from 0 to 290. In the second experiment two groups of ten two to four-month-old chicks were given the usual diet containing about 102 I.U. of vitamin A per bird per day. The first group was free from infection—the second was naturally infected with *A. galli*. Four ascarid-free birds showed lesions due to hypovitaminosis seven to ten months after the beginning of the experiment. The infected birds showed lesions after two months of feeding a vitamin A-deficient diet. Vitamin A content in the livers of the first group was much higher than in the infected birds. In the third experiment 40 healthy chicks of five weeks old and under were put in pens contaminated with ascarid eggs. All the birds received 2 oz. of green feed daily in addition to the usual ration. Group A received five minims of chenopodium oil once a fortnight. Examination of mixed faecal samples for four experimental months did not reveal ascarid infection. The authors conclude that 2 oz. of green feed per chick daily is sufficient to ensure resistance against *A. galli* infection in chicks.

N. Jones

212—PETROCHENKO, V. I. & KOTELNIKOV, G. A., 1959. [Vsesoyuzni institut gelmintologii imeni akademika K. I. Skryabina.] [Prophylaxis of helminthiasis in waterfowl in the Far East.] *Veterinariya*, 36 (8), 34-37. [In Russian.]

Petrochenko & Kotelnikov report on investigations made in 1957-58 in the Khabarovsk region. The most frequent helminthiases were: in geese, amidostomiasis (up to 80%), drepanidotaeniasis, heterakiasis; in ducks, hymenolepidiasis, heterakiasis and *Tetrameres* infection. Various intestinal infections of ducks and geese, caused by trematodes were also found. 7% to 8% of crustaceans inhabiting small water reservoirs were found to be infected with cestode larvae. Only 11 to 12 days were needed for the development of *Drepanidotaenia lanceolata* cysticercoids, which matured in ducks within 15 days. It is suggested that control of these infections could be achieved by breeding waterfowl in restricted numbers on large reservoirs only, keeping young birds away from contaminated water, observing an annual or biennial following rotation, and examining birds for helminthic infections annually.

N. Jones

213—ROŠKO, L., 1958. [Stát. ved. vet. ústav, Bratislava, pob. Košice.] "Nález nematóda *Eucoleus annulata* (Molin 1858) u hrabavej hydiny na Slovensku." *Československá Parasitologie*, 5 (2), 151-152.

Roško reports on the finding of *Eucoleus annulata* from a chicken. This, it is suggested, is the first record of this parasite in Slovakia.

N. Jones

214—ROSS, E. & ALICATA, J. E., 1959. [Departments of Poultry Science & Parasitology, Hawaii Agricultural Experiment Station, Honolulu, Hawaii.] "The effect of piperazine citrate on egg production." *Poultry Science*, 38 (1), 230-231.

Ross & Alicata administered orally to 50 hens 200 mg. of piperazine citrate per kg. body-weight and to 68 other hens a single dose of 500 mg. in a tablet. As compared with 44 control hens there was no adverse effect on egg production in either group. N. Jones

215—SIEGMANN, O. & BÜLOW, V. v., 1959. [Bundesforschungsanstalt für Kleintierzucht Celle, Tiermedizinische Abteilung.] "Orientierende Versuche mit Hygromycin B zur Bekämpfung von Helminthen beim Geflügel." *Deutsche Tierärztliche Wochenschrift*, 66 (7), 173-178. [English summary p. 178.]

Siegmann & Bülow conducted laboratory and field trials to determine the anthelmintic properties of hygromycin B against nematodes and cestodes in the fowl. The active principle hygromycin B was used as the commercial product Hygromix, which was premixed as a percentage of the normal feed; experimental methods and results are given together with a discussion of the latter. The authors give results to show that Hygromix, at a concentration of 0.453% of the normal feed, had no immediate effect upon egg-laying and viability of eggs in the fowl. They present evidence showing that when cockerels, which had previously been experimentally infected with *Ascaridia galli*, were fed with 0.5% Hygromix in the normal feed over a period of four weeks an inhibitory and vermicidal effect was apparent. During field trials, naturally infected fowls were fed for two months with 0.45% of Hygromix in their normal feed. Results are given showing that *Ascaridia galli* and *Heterakis* were successfully combatted but that *Capillaria* and unnamed cestodes, together with coccidian protozoa, were unaffected.

I. C. Williams

216—STEFĀŃSKI, W. & ŽEBROWSKI, L., 1958. "Untersuchungen über die Rolle der *Ascaridia galli* als Virusträger in der Pseudo-Geflügelpest (Newcastle disease), sowie über den Synergismus beider Faktoren." *Ceskoslovenská Parasitologie*, 5 (2), 181.

Stefáński & Žebrowski isolated Newcastle disease virus from whole *Ascaridia galli* specimens from chickens, which had been experimentally infected with both the helminth and the virus. Few positive results were obtained from internal organs of the worms and no virus was isolated from their eggs. Newcastle disease developed more slowly in worm-infected birds than in the worm-free ones.

N. Jones

217—ŠTEFFLOVÁ-LEISKÁ, M., 1957. [Parasitologický ústav KU, Praha.] "Výzkum endoparasitů drůbeže v Čechách." *Ceskoslovenská Parasitologie*, 4, 337-350. [German summary pp. 347-348.]

Štefflová-Leiská examined post-mortem 523 chickens, 269 geese and 116 ducks. One trematode species, 15 cestode and ten nematode species were found. *Hymenolepis fragilis*, *Fimbriaria fasciolaris*, *Capillaria columbae*, *C. longicollis* and *Trichostrongylus tenuis* are recorded for the first time in Czechoslovakia. The author notes the total absence of *Syngamus trachea* infection.

N. Jones

218—ZAJÍČEK, D. & VALENTA, Z., 1958. [Státní vědecký veterinární ústav, Praha.] "Notocotylosa a cotylurosa jako příčina hynutí kachňat." *Ceskoslovenská Parasitologie*, 5 (2), 213-216. Zajíček & Valenta report on *Cotylurus cornutus* and *Notocotylus attenuatus* from ducks. The former trematode was more frequent than the latter in the biocoenosis of a fish pond, which is described.

N. Jones

219—ŽARNOWSKI, E., 1958. [Wyższa szkoła rolnicza, Lublin, Poland.] "Zur Therapie der Askaridose der Hühner." *Ceskoslovenská Parasitologie*, 5 (2), 223. Zarnowski compares the results obtained with some anthelmintics in the therapy of *Ascaridia galli* in chickens.

N. Jones

Other Birds

See also Nos.: 40, 291, 295, 297, 302, 308, 312, 388, 391.

220—DALY, E. F., 1959. [Yale University, New Haven, Connecticut, U.S.A.] "A study of the intestinal helminths of the southern crow (*Corvus brachyrhynchos paulus*) in Virginia." **Proceedings of the Helminthological Society of Washington**, **26** (1), 66.

Daly examined the intestines and cloaca of 103 southern crows, *Corvus brachyrhynchos paulus* Howell, shot in Virginia, U.S.A., during the autumn, winter and spring of the year 1956-57. A total of 62 of the 103 crows examined was found to be infected with eight different species of helminths. Cestodes infected 54% of the hosts, the species being *Anomotaenia constricta* on 35 occasions, *Hymenolepis variabile* on 25 occasions, *Paruterina reynoldsi* on four occasions and *Cladotaenia* sp. once. Nematodes infected 9% of the hosts with *Porrocaecum ensicaudatum* in eight birds and *Porrocaecum* sp. in one bird. Trematodes infected 6% of the hosts, with *Echinostoma revolutum* in six birds; the acanthocephalan *Mediorhynchus grandis* was found in one bird.

I. C. Williams

221—WEBSTER, G. A., 1959. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Orchipedium tracheicola reported from a whistling swan, *Cygnus columbianus*." **Canadian Journal of Zoology**, **37** (2), 213.

Orchipedium tracheicola is reported from the trachea, and acanthocephalans from the middle and lower intestine of a juvenile *Cygnus columbianus* found frozen in the ice near Edmonton, Alberta.

S. Willmott

Miscellaneous

See also Nos.: 26, 114, 395, 400, 401, 406, 425, 426.

222—ABDEL MALEK, E., 1959. [University of Khartoum, Sudan.] "Check-list of helminth-parasites of domesticated animals in Sudan." **Indian Veterinary Journal**, **36** (6), 281-288.

Abdel Malek lists the results of his examinations of cattle, equines, camels, dogs, cats and fowls in various areas of the Sudan. Tables set forth the helminths found, their location in the host, the number of animals examined and infected, and the localities involved. [There is nothing to indicate that any of these records are new.]

J. M. Watson

223—ALWAR, V. S. & LALITHA, C. M., 1959. [Department of Parasitology, Madras Veterinary College.] "Notes of parasitological interest." **Madras Veterinary College Annual**, **17**, 17-19.

Alwar & Lalitha report that *Fasciola gigantica* was found from the lungs, ruminal wall, duodenum, bile-ducts and gall-bladder of a heifer. About 40% of the flukes were immature. Unsheathed microfilariae were found in the auricular blood and in cutaneous haemorrhagic nodules on the abdomens of three male elephants. Microfilariae from the nodules were larger than those from auricular smears.

N. Jones

224—ANON., 1959. "Resistance to invaders." [Editorial.] **British Veterinary Journal**, **115** (4), 103-104.

The author stresses, *inter alia*, the importance of host resistance to verminous parasites, particularly in equines, and refers to the recent discovery of a vaccine against parasitic bronchitis in cattle as a major medical discovery.

J. M. Watson

225—GALUZO, I. G., 1959. [Institute of Zoology, Academy of Sciences of Kazakh S.S.R.] "Blood-sucking ticks of wild vertebrates as carriers and transmitters of diseases of domestic animals in the U.S.S.R." **International Congress of Zoology** (15th), London, July 16-23, 1958. **Proceedings**, pp. 666-668. [Discussion pp. 668-669.]

In the course of a discussion of Pavlov's theory of Natural Foci of Disease, with special reference to the relationship between tick-transmitted infectious diseases of wild animals and those of domestic animals in the U.S.S.R., Galuzo remarks that study of the foci of helminthiases have revealed the part played by wild ungulates and birds as reservoirs of such infections in domestic animals.

J. M. Watson

226—GRAVES, E. F., 1959. [Spennard, Alaska] "Veterinary practice in Alaska." *Journal of the American Veterinary Medical Association*, 134 (12), 540-541.

Graves remarks that ascarids and tapeworms are the internal parasites which the veterinarian in Alaska most frequently encounters. Hookworms are not often found in dogs there but are common in foxes.

J. M. Watson

227—KOTRLÝ, A., 1958. [Výzkumný ústav lesa a myslivosti ČSAZV, Zbraslav n.Vlt.] "Plicní helmintofauna spárákaté zvěře v ČSR." *Československá Parasitologie*, 5 (2), 101-110. [Russian summary pp. 109-110.]

Kotrlý reports that as a result of post-mortem examinations of 712 specimens of Cervidae, Bovidae and Suidae, ten species of lung nematodes were found. *Dama dama* is reported as a new host of *Bicaulus sagittatus*. The commonest parasites were: in *Cervus elaphus*, *Dictyocaulus viviparus* (55%); in *Dama dama*, *Bicaulus sagittatus* (12%); in *Capreolus capreolus*, *Capreocaulus capreoli* (58%); in *Ovis musimon*, *Muellerius capillaris* (59%); in *Rupicapra rupicapra*, *Neostongylus linearis* (53%); and in *Sus scrofa*, *Metastrongylus pudendotectus* (80%). *Bicaulus sagittatus*, *M. elongatus*, *M. pudendotectus* and *M. salmi* are reported for the first time from Czechoslovakia. Other lungworms found were *Protostrongylus kochi* and *Muellerius tenuispiculatus*.

N. Jones

228—MATOFF, K. & WASSILEFF, I., 1959. [Université de Sofia, Institut supérieur de Médecine vétérinaire, Institut de Parasitologie, Sofia, Bulgaria.] "Über die Artzugehörigkeit der Ascaridata des Schafes (*Ovis aries*)."
Zeitschrift für Parasitenkunde, 19 (2), 111-135.

Matoff & Wassileff, after having examined a great number of ascarids from lambs and sheep, compared their mode of development with that of *Ascaris suum* Goeze. The only difference the authors found between this species and *Ascaris ovis* Rudolphi, was the difference in the body and separate organ size. *Neoascaris*, recovered from lambs, were thoroughly examined and their characteristics were found to correspond exactly with those of *N. vitulorum* from calves. Calves were successfully infected by the intra-uterine route with *Neoascaris* from lambs. Developmental cycles of the two parasites, as compared in laboratory animals, were found to be similar. An attempt to infect *per os* one pregnant sheep, two calves and two lambs with larvae obtained from the two experimentally infected calves proved unsuccessful. In lambs, development of *Neoascaris* was retarded and the infection intensity was lower than in calves. It is concluded that lambs should be also considered as hosts of *N. vitulorum*.

N. Jones

229—SKJENNEBERG, S., 1959. [Statens veterinaere laboratorium for Nord-Norge, Harstad.] "Ekinokkose hos rein i Kautokeino. Faren for overføring til menneske. Bekjempelse." *Nordisk Veterinaermedisin*, 11 (2), 110-123. [English & German summaries pp. 121-123.]

Skjenneberg reports on the incidence of hydatid in reindeer in Northern Norway and discusses the risk of human infection. During 1956-57, 711 reindeer were examined and 94 (13.2%) were found to be infected; the figures for 1957-58 were 1,493 and 117 (7.8%) respectively. All cysts were found in the lungs. It is assumed that dogs transmit infection to reindeer and the possibility that man may be infected from the same source is enhanced by the poor sanitary conditions in which the reindeer-owning Lapps of Northern Norway live. Preventive measures suggested are the anthelmintic treatment of dogs, the collection and burning of infected reindeer offal so that dogs have no access to it, and the health education of the population.

A. E. Fountain

230—SUPPERER, R., 1959. "Lehren aus Praxisfällen." *Wiener Tierärztliche Monatsschrift*, 46 (5), 398-401.

Supperer discusses: (i) infection of cats and dogs with tapeworms; (ii) the possibility of mistaking pruritus caused by *Dipylidium caninum* for enterobiasis in dogs; (iii) interpretation of coprological findings; (iv) diagnosis of lungworm infection in cattle and (v) the possibility of freeing pastures from lungworm larvae.

N. Jones

FISHERIES HELMINTHOLOGY

Fresh-Water

See also Nos.: 40, 130, 282, 389.

231—DYK, V., 1958. [Katedra parazitologie veterinární fakulty Vysoké školy zemědělské, Brno.] “Dynamika motolice *Crepidostomum farionis* (O. F. Müller 1784) a její vztahy k hostitelům a prostředí.” **Československá Parasitologie**, 5 (2), 51–57. [German & Russian summaries pp. 55–56.]

Dyk discusses the population dynamics and ecology of *Crepidostomum farionis*. In 1954–56 this parasite was found in lake trout and *Salvelinus fontinalis* as well as river trout. The difference in the incidence of infection at different altitudes and between river trout, lake trout and *S. fontinalis* is ascribed to differences in the feeding habits of the hosts. The incidence of *C. farionis* in *S. fontinalis* reached its maximum a month later (August) than in the river trout. Adult parasites disappeared from the digestive tract of the common trout in the autumn.

N. Jones

232—DYK, V. & DYKOVÁ, S., 1957. [Parasitologická katedra veterinární fakulty Vysoké školy zemědělské a lesnické, Brno.] “*Bulbodacnitis globosa* Zeder, 1800, další hlístice našeho pstruha obecného.” **Československá Parasitologie**, 4, 113–120. [German & Russian summaries pp. 118–119.]

Dyk & Dyková found eleven specimens of *Bulbodacnitis globosa* in south Czechoslovakia in 1956. Three out of five specimens of *Trutta trutta* m. *fario* harboured both sexes of this parasite. The description, with illustrations, of these specimens, which differ slightly from others described in the literature, is given. The size of the specimens found was greater than that recorded for *B. globosa* by Zakhvatkin from *Stenodus leucichthys nelma* in Siberia. The parasites were localized in the intestines and no pathological changes were observed in the host. This is said to be a first record for Czechoslovakia.

N. Jones

233—GRABDA, E. & GRABDA, J., 1958. [Olsztyn, Poland.]—“Trachelastosa ccjna velkého (trachelastosis *Abramis bramae*) v Polsku.” **Československá Parasitologie**, 5 (2), 89–91. Grabda & Grabda report infection of *Abramis brama* in Lake Jamno (Poland) with *Diplostomulum*.

N. Jones

234—PACÁK, Š., 1957. [Laboratórium rybárstva Slovenskej akadémie vied, Bratislava.] “Príspevok k štúdiu parazitofauny salmonidov v potoku Demänová.” **Československá Parasitologie**, 4, 239–247. [German & Russian summaries pp. 246–247.]

In 1955 Pacák found seven helminth species from 44 specimens of Salmonidae; these are described and figured. Four of these were found for the first time in Czechoslovakia, namely, *Tetraonchus borealis*, *Cyathocephalus truncatus*, *Cystidicola farionis* and *Echinorhynchus farionis*. These, as well as *Crepidostomum farionis* and *E. salmonis*, were found in fish in a tributary of the river Váh. In the main river *Caryophyllaeus laticeps* was found in *Leuciscus leuciscus*. The importance of these findings in relation to the Demänová River fishery is discussed.

N. Jones

235—VOJTEK, J., 1959. [Zoologický ústav Masarykovy university, Brno.] “*Metagonimus yokogawai* Katsurada 1912, nový druh metacercariai pro faunu ČSR.” **Věstník Československé Zoologické Společnosti**, 23 (1), 70–73. [German & Russian summaries p. 72.]

Vojtek found *Metagonimus yokogawai* metacercariae under the scales of *Abramis brama* and *Aspius aspius* in the neighbourhood of Komarno. This is the first report of this parasite in Czechoslovakia.

N. Jones

Marine

See also Nos.: 279, 281, 283, 284, 293, 294.

236—MYERS, B. J., 1959. [Institute of Parasitology, McGill University, Macdonald College P.O., Que., Canada.] "Parasites from elasmobranch hosts from the Magdalen Islands region of the Gulf of St. Lawrence." *Canadian Journal of Zoology*, **37** (3), 245-246.

Myers lists 19 species of helminth parasites including nine cestodes, seven trematodes and three nematodes from 173 skates and 157 sharks belonging to five species caught off the Magdalen Islands in the Gulf of St. Lawrence.

H. H. Williams

237—ROBINSON, E. S., 1959. [Department of Zoology, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Records of cestodes from marine fishes of New Zealand." *Transactions of the Royal Society of New Zealand*, **86** (1/2), 143-153.

Robinson describes and illustrates cestodes from marine fishes in Cook Strait and Wellington Harbour, New Zealand. *Phyllobothrium lactuca* was found in the spiral valve of nine of 12 *Mustelus lenticulatus* and in both of two *Carcharodon carcharias*. *P. dohrnii* occurred in the spiral valve of *Notorhynchus pectorosus*. One larva of *Orygmatobothrium versatile* was found in *M. lenticulatus*. Five immature specimens of *Ceratobothrium xanthocephalum* were recovered from *Isurus glaucus*. Post-larvae of *Nybelinia* (? *Syngenes*) occurred in *Zeus faber*, *Trachurus novae-zealandiae* and in every specimen of *Thyrsites atun*, where they formed solid masses with *Stomachus marinus*. Having found no *Nybelinia* (? *Syngenes*) in *Lepidopus caudatus*, the author suggests that the report of this parasite by Leiper & Atkinson (1914) could be from *T. atun* and not from *L. caudatus*, both species having been given the same common name (barracouta). Post-larvae of *Hepatoxylon trichuri* were found in four species of Teleostei and five species of Elasmobranchii. One of these post-larvae remained alive in Tyrode's solution for 87 days with daily change of medium. *H. megacephalum* post-larvae were found in *Galeorhinus australis*, *Notorhynchus pectorosus* and *Dalatius licha* and adults occurred in *Carcharodon carcharias*. This species differs from *H. trichuri* in shape of proboscides, smaller size of hooks, position of vaginal sphincters and greater number of testes. Plerocerci of *Lacistorhynchus tenuis* were found in *Zenopsis nebulosus*, *Agnostomus forsteri* and *Thyrsites atun* and adult forms in *G. australis*. *Grillotia heptanchi* adult forms were found in *N. pectorosus*. A plerocercus of *Gymnorhynchus* (*Molicola*) *horridus* was recovered from *Mola mola* which harboured also *Anchistrocephalus microcephalus*. *Bothriocephalus scorpii* was found in *Physiculus bachus*.

N. Jones

Miscellaneous

See No. 304.

NEMATOLOGY

Free-Living Nematoda

See also Nos.: 320, 322.

238—GERLACH, S. A., 1958. [Zoologisches Institut der Universität, Kiel, Germany.] "Die mangroveregion tropischer Küsten als Lebensraum." *Zeitschrift für Morphologie und Ökologie der Tiere*, **46** (6), 636-730.

Gerlach gives a thorough general analysis of the fauna of mangrove regions in relation to environmental conditions, taking as his focal point his study of the mangrove areas of Cananéia, São Paulo, Brazil. He discusses the topography, the vegetation, the climate, and soil profiles in relation to salinity. The ecological analysis of the fauna is concerned mostly with nematodes, which are grouped in relation to five characteristic environments within the mangrove region. There is a lengthy discussion of the influence of environmental factors on the fauna and of the mangrove swamp as environment in comparison with the shallows.

R. W. Timm

239—GERLACH, S. A., 1958. [Zoologisches Institut der Universität, Kiel, Germany.] "Die Nematodenfauna der sublitoralen Region in der Kieler Bucht." **Kieler Meeresforschungen**, 14 (1), 64-90. Of more than 30,000 marine nematodes collected from 231 stations in Kiel Bay, 254 species were found in the sublitoral region at depths of 2m. to 28m. Gerlach presents the distribution of the nematodes according to different environments and different depths (five inserts). Four ecological groups are recognized: (i) eurytopic forms, found in various habitats; (ii) characteristic species of sand bottoms; (iii) characteristic species of mud bottoms; (iv) characteristic species of algal zones (phytal).
R. W. Timm

240—OVERGAARD NIELSEN, C., 1959. [Mols Laboratoriet Femmøller, Denmark.] "Soil fauna and the moisture regime of its environment." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, pp. 349-350. [Discussion pp. 350-351.] The relation of the soil fauna (including nematodes) to the amount of water in the soil and humidity is discussed. The physical concept of hydrostatic pressure deficiency in terms of pF is described and Overgaard Nielsen conjectures how soil animals will behave over different parts of the pF scale.
H. R. Wallace

241—REMANE, A., 1959. [Zoologisches Institut der Universität, Kiel, Germany.] "Die interstitielle Fauna des Meeresandes." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, pp. 320-323. The characteristic groups of the interstitial fauna are described. Characteristics of the environment, movement and body form, food, distribution and other ecological relationships are mentioned. Brief reference is made to nematodes.
H. R. Wallace

242—RENAUD-DEBYSER, J., 1959. [Laboratoire d'Anatomie comparée, Sorbonne, Paris.] "Contribution à l'étude de la faune interstitielle du Bassin d'Arcachon." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, pp. 323-325. [Discussion pp. 325-326.] The animal groups which constitute the interstitial fauna at Arcachon are described. The sand population, 50-60% of which are nematodes, is very stable. Studies on repopulation after an excessively cold period showed that the proportional numbers of the different animal groups were reconstituted to give a population similar to that existing before the cold period.
H. R. Wallace

243—ZINN, D. J., 1959. [Department of Zoology, University of Rhode Island, Kingston, Rhode Island, U.S.A.] "The interstitial fauna of sand." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, pp. 317-319. This is an introduction to a symposium on intestinal fauna in which brief reference is made to the large populations of nematodes which occur in the inter-tidal zone of marine beaches.
H. R. Wallace

Plant-Parasitic Nematoda

See also Nos.: 303, 320.

244—ALCOCER GOMEZ, L., 1959. [Instituto Politecnico Nacional, Mexico, D.F.] "Morfología y biología de un nemárido aislado de las raíces nodulares de plantas de jitomate, *Lycopersicum esculentum* Mill., de las principales regiones agrícolas de México." Thesis, Mexico, 43 pp. The author describes nematodes of an unidentified species of *Heterodera* [= *Meloidogyne*] found in root galls of tomato and other cultivated plants in Mexico. The gross morphological characters of the principal stages of the nematode are given and some account of the histology of the infested roots. Development of the eggs and hatching of the larvae *in vitro* are described, and the life-history of the nematode in pot-grown tomatoes. Second generation larvae appeared in about 78 days in sandy soil and 98 days in clay soil. Three nematicides were tested in a pot experiment: commercial formaldehyde at concentrations of 5%, 3% and 2% applied at 5 litres per sq. m., D-D or Nemagon at 3, 2 and 1 ml. per sq. m. Infested soil was used and tomato seed was sown. Germination and growth were normal in the formaldehyde and D-D pots but with Nemagon both were retarded. After 90 days' growth the roots were examined and light infestation was found in the formaldehyde and D-D series but the Nemagon series appeared free from infestation. Detailed results are not given.
M. T. Franklin

245—ANON., 1959. "Diseases of cabbages, cauliflowers and related plants." **Agricultural Gazette of New South Wales**, **70** (4), 194-204.

Root-knot disease, caused by *Meloidogyne* spp., is briefly mentioned. The swellings on the roots can be confused with club root. M. T. Franklin

246—ANON., 1959. "Disease in the flower garden." **Agricultural Gazette of New South Wales**, **70** (7), 343-354, 382.

The popular article briefly mentions that root-knot nematodes [*Meloidogyne* spp.] occur on many garden plants, especially carnations and dahlias, and that chrysanthemums, cyclamens, succulents and ferns are attacked by leaf nematodes [*Aphelenchoides* spp.]. D. J. Hooper

247—BERNARD, J., 1958. "Recherches sur les plantes hôtes d'une souche de *Ditylenchus dipsaci* Kühn provenant de l'avoine." **Parasitica. Gembloix**, **14** (1), 17-27. [English summary p. 27.]

Bernard tested a race of *Ditylenchus dipsaci* from oats on 28 plant species. Of these, pea (*Lathyrus sativus*), bean (*Phaseolus vulgaris*), turnip and radish were well infected; onion, leek and rape were infected to a lesser degree and carrot, lucerne and tomato had slight infections. Other plants were resistant to infection. The host range of this oat race is compared in tabular form with some published host ranges of other *D. dipsaci* populations.

D. J. Hooper

248—COLLIS-GEORGE, N. & BLAKE, C. D., 1959. "The influence of the soil moisture regime on the expulsion of the larval mass of the nematode *Anguina agrostis* from galls." **Australian Journal of Biological Sciences**, **12** (3), 247-256.

Collis-George & Blake consider the morphology of floret galls formed on *Agrostis tenuis* Sibth. by *Anguina agrostis* and the method of expulsion of the mass of second-stage larvae contained within these galls. From the results of several detailed experiments they conclude that expulsion of the larval mass is a physical process resulting from the imbibition of water by a matrix in which the larvae are embedded, causing the rupture of the gall rind, and that the larvae take no active part in the expulsion. The expulsion is controlled by two soil water properties: (i) the soil water suction against which the gall imbibes water from the soil; (ii) the hydraulic conductivity of the soil which permits transmission of water through the soil to the gall. Osmotic pressure does not appear to influence expulsion. Conditions in the field for optimum germination of host seedlings coincide with the conditions for maximum expulsion and movement of larvae and are of nematode survival value.

D. J. Hooper

249—COPPOCK, L. J. & WINFIELD, A. L., 1959. "White cysts of cereal root eelworm on oat stubble." **Plant Pathology**, **8** (1), 38.

White cysts of the cereal root eelworm *Heterodera major* (O. Schmidt, 1930) were found on roots of oat stubble in February 1958. It was concluded that development of this eelworm may continue on unploughed oats during a mild winter. J. J. Hesling

250—CRITTENDEN, H. W., 1959. "Production of lateral roots in soybean varieties resistant and susceptible to *Meloidogyne incognita acrita*." [Abstract of paper presented at the 16th Annual Meeting of the Potomac Division, American Phytopathological Society, Beltsville, Md, U.S.A., February 26-27, 1959.] **Phytopathology**, **49** (8), 523.

Two resistant and two susceptible varieties of soya bean were grown for periods of 8, 16 and 32 days in uninfested soil and in soil infested with *Meloidogyne incognita* var. *acrita*. Invasion by the eelworm in secondary roots of the two susceptible varieties caused a significant decrease in the number of tertiary roots produced compared with uninfected plants. There was no difference in the number of tertiary roots in infected and uninfected resistant plants. Inhibition of tertiary root formation is positively correlated with enlargement of the pericyclic region in areas of invaded secondary roots in susceptible varieties. Size of gall caused by *M. incognita* var. *acrita* and the number of lateral roots produced in soya bean varieties are affected by potassium.

A. M. Shepherd

251—DAVIS, R. A., 1959. "Cytological and histological effects of *Xiphinema diversicaudatum* and *Meloidogyne hapla* on rose roots." [Abstract of paper presented at the 16th Annual Meeting of the Potomac Division, American Phytopathological Society, Beltsville, Md, U.S.A., February 26-27, 1959.] **Phytopathology**, 49 (8), 523.

Descriptions are given and comparisons made of the structure of the galls formed by the ectoparasite *Xiphinema diversicaudatum* and the endoparasite *Meloidogyne hapla* on rose roots. In each case hyperplasia of the cortical cells occurred and giant cells were formed, of which the structure is described.

A. M. Shepherd

252—FIDLER, J. H., CHURCH, B. M. & SOUTHEY, J. F., 1959. "Field sampling and laboratory examination of cereal root eelworm cysts." **Plant Pathology**, 8 (1), 27-34.

This paper gives a detailed description of an experiment to find the errors and losses involved in estimating populations of *Heterodera major* cysts. It was concluded that, for routine estimation of cyst population, a sample of 200 gm. of soil taken from a well mixed bulk sample of 2.5 kg. obtained from about 50 randomly located points in a field should prove sufficient. The average loss of cysts in the Fenwick can was only about 6% of all cysts and this 6% contained very few viable cysts. There is a list of practical recommendations which should help to make estimates of cyst population comparable.

J. J. Hesling

253—GOFFART, H., 1958. "Methoden zur Bodenuntersuchung auf zystenbildende Nematoden." **Nachrichtenblatt des Deutschen Pflanzenschutzdienstes**, Stuttgart, 10 (4), 49-53. [English summary p. 53.]

This is a comprehensive account of methods of extracting *Heterodera* cysts from soil and of techniques for estimating their contained egg content. Goffart points out that these techniques do not permit the identification of each cyst, and that the viability of eggs and larvae can be determined by staining them with Chrysordin.

J. J. Hesling

254—GRAHAM, C. W., 1958. "A nematode genus new to Europe." **Plant Pathology**, 7 (3), 114. This briefly reports the presence of *Nacobbus* sp. causing galls on tomato roots from Wokingham, Berks. Photographs of galled roots and of an adult female are given.

J. B. Goodey

255—GRAINGER, J., 1959. [Department of Plant Pathology, West of Scotland Agricultural College, Auchincruive, Ayr.] "Effects of diseases on crop plants." **Outlook on Agriculture**, London, 2 (3), 114-121.

Grainger stresses the need to specify more exactly the losses caused to crops by various diseases. An attempt is made to classify disease into three main categories of damage (i) where the whole plant is affected, (ii) where only localized parts of the plant are infected by the parasite and (iii) where the effects of a disease outbreak are spread over more than one season. Potato-root eelworm is in the third category. In this connection it is stated that potato-root eelworm can persist in the cool Scottish soils for up to 30 years in the absence of potatoes and still produce serious disease at the end. It is suggested that with this type of parasite the system of agriculture must be changed either by abandoning the cultivation of susceptible crops or by using them in a very long rotation.

H. R. Wallace

256—HIRSCHMANN, H., 1959. "Histological studies on the anterior region of *Heterodera glycines* and *Hoplolaimus tylenchiformis* (Nematoda, Tylenchida)." **Proceedings of the Helminthological Society of Washington**, 26 (2), 73-90.

These very detailed studies showed that the cuticle of males of *Heterodera glycines* and of *Hoplolaimus tylenchiformis* [= *H. coronatus*] appears to consist of cortical, matrix and fibre layers as in other nematodes. Only the cortical layer resists cold 5% sodium hypochlorite but hot disintegrates it. The innermost layer has twice as frequent transverse striations as the cortical layer. Just behind the head, between cuticle and hypodermis, structures similar in form to the hemizonid were found and named "cephalids", though no further light is thrown on their function or that of the hemizonid. The detailed structure of the lip region, amphids, musculature of the spear and body musculature was investigated by observation of whole mounts and sections and is described and figured in detail.

J. B. Goodey

257—ISIKAWA, M. & MIYAHARA, T., 1958. [Kariwano Experimental Farm, Tôhoku National Agricultural Experiment Station, Akita-ken, Japan.] [Reaction of soya bean varieties to the soya bean nematode (*Heterodera glycines*).] **Japanese Journal of Breeding**, 8 (2), 111-118. [In Japanese: English summary p. 118.]

Among 64 soya bean varieties which were tested in 1956 and 49 varieties in 1957, the authors found that the following eight varieties were highly resistant to the soya bean cyst nematode, *Heterodera glycines*: Nangun-takedate, Tanryoku (2), Meguro, Geden-shirazu No. 1, Takedate No. 1, Iwate-yagi No. 1, Iwate No. 2, and Daichi-hienuki. All of these are late-ripening varieties in Tôhoku district (the north-eastern district of Honshû). The authors also studied the correlation between the susceptibility of soya bean varieties to this nematode and the growth of the plants.

M. Ichinohe

258—JOHNSTON, T. M., 1959. [Department of Plant Pathology, Louisiana State University, Baton Rouge, Louisiana, U.S.A.] "Effect of fatty acid mixtures on the rice stylet nematode (*Tylenchorhynchus martini* Fielding, 1956)." [Correspondence.] **Nature. London**, 183 (4672), 1392.

Nematodes were submerged in concentrations of 10^{-2} , 10^{-3} and $10^{-4} M$ in distilled water, of butyric, propionic, acetic and formic acids, either made up individually, or in combination. Acid mixtures were more effective than any one acid in causing inactivation of the nematodes. Effectiveness of individual acids was related to molecular weight, butyric being most active, and effectiveness of acid mixtures was related to combined molecular weight. J. E. Peachey

259—KRADEL, J., 1957. [Biologische Zentralanstalt, Berlin.] "Untersuchungen zum Wirtspflanzenkreis einer Herkunft des Stock- und Stengelälchens (*Ditylenchus dipsaci*) (Kühn 1858 Filipjev 1936). 2. Mitteilungen." **Nachrichtenblatt für den Deutschen Pflanzenschutzdienst. Berlin**, 11 (2), 32-34. [English & Russian summaries p. 32.]

Investigations on the host range of *Ditylenchus dipsaci* show that of 71 plant species tested, almost all of which were susceptible or had been reported susceptible by earlier workers, two were new hosts. These are *Helianthus tuberosus* and *Phacelia tanacetifolia*. J. B. Goodey

260—LOOS, C. A., 1959. "Symptom expression of *Fusarium* wilt disease of the Gros Michel banana in the presence of *Radopholus similis* (Cobb, 1893) Thorne, 1949 and *Meloidogyne incognita acrita* Chitwood, 1949." **Proceedings of the Helminthological Society of Washington**, 26 (2), 103-111.

Using inocula of *Fusarium oxysporum* f. *cubense*, alone and in combination with *Radopholus similis* or *Meloidogyne incognita* var. *acrita*, Loos carried out experiments in large pots for their effects on Gros Michel bananas grown as "button seed" plants. These were compared with similar experiments using the nematodes alone and control pots with neither nematode nor fungus. At a very high level of fungal inoculation *Fusarium* wilt occurred to some extent but in the presence of *R. similis* the disease was severe and showed early. *M. incognita* var. *acrita* alone had less effect on the plant than did *R. similis* which caused severe root damage and internal lesions in the rhizome. *R. similis* by itself can cause sufficient damage so to weaken the roots that plants are poor and easily tipped over by high winds. J. B. Goodey

261—MORETON, B. D., 1958. "New host records for root-knot eelworms." **Plant Pathology**, 7 (3), 114.

Moreton records the finding of *Meloidogyne incognita*, possibly mixed with the variety *acrita*, in root galls on pot-grown plants of *Cyclamen persicum* Mill. D. J. Hooper

262—NOLTE, H. W., 1957. [Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften zu Berlin.] "Nematoden als Schädlinge von Holzgewächsen." **Nachrichtenblatt für den Deutschen Pflanzenschutzdienst. Berlin**, 11 (6), 121-125. [English & Russian summaries p. 124.]

Nolte reviews the literature of the relationships of nematodes to woody plants. Damage to trees in nurseries can be caused by nematodes, lack of nutrients or toxins set free by plant decomposition, all of which come under the general heading of soil sickness. There are two tables showing the relationships of nematode numbers to healthy and sick plants, and four figures. J. B. Goodey

263—PEACOCK, F. C., 1959. [I.C.I. Ltd., Jeacott's Hill Research Station, Bracknell, Berks.] "Dagger nematodes associated with a clover sickness." [Correspondence.] *Nature. London*, **184** (4680), 123.

Xiphinema sp. was found associated with poor plants of *Trifolium repens* which had small lesions on the roots. *Ditylenchus dipsaci* was later found and appeared to be the possible cause of dying patches of the white clover. The *Xiphinema* is being described elsewhere.

J. B. Goodey

264—PEARMAN, J. A., 1959. [New South Wales Department of Agriculture.] "Diseases of dahlias." *Agricultural Gazette of New South Wales*, **70** (7), 369-375.

This popular article includes a short description of symptoms caused by root-knot nematodes (*Meloidogyne* spp.) on dahlia roots. Infected plants should be burned and the soil treated with a nematicide when economically feasible.

D. J. Hooper

265—RACE, S. R. & HUTCHINSON, M. T., 1959. "Susceptibility of various plants to *Pratylenchus penetrans* as determined by behavior of the nematodes, lesion formation, and root growth." [Abstract of paper presented at the 16th Annual Meeting of the Potomac Division, American Phytopathological Society, Beltsville, Md, U.S.A., February 26-27, 1959.] *Phytopathology*, **49** (8), 525.

Race & Hutchinson grew seedlings of 14 plant species in autoclaved soil in petri dishes to which were added *Pratylenchus penetrans*. Tomato, lettuce, chrysanthemum and broccoli were excellent hosts; crown vetch, peach, red clover and sweet corn were good hosts; carrot, radish, strawberry and turnip fair hosts. Asparagus and blueberry were poor hosts, the roots of the former being toxic to any nematodes that entered and those of the latter being markedly unattractive.

D. J. Hooper

266—ROBINSON, T. & NEAL, A. L., 1959. [Dept. of Bacteriology and Botany, Syracuse University, Syracuse, New York.] "The influence of certain mineral elements on emergence of golden nematode larvae." *Proceedings of the Helminthological Society of Washington*, **26** (1), 60-64.

Robinson & Neal find that hatching of *Heterodera rostochiensis* may be influenced by the kind and concentration of the cations present in the hatching solution. Replacing the cations in tomato root leachings by a mixture of sodium, potassium, magnesium and calcium ions increased the stimulatory properties of the leachings. The authors suggest that the cations of zinc, cadmium and heavy metals may be inhibitory.

R. D. Winslow

267—SCHILKE, P. J. & CRITTENDEN, H. W., 1959. "Host-parasite relationships of soybean and a root-knot nematode *Meloidogyne hapla*." [Abstract of paper presented at the 16th Annual Meeting of the Potomac Division, American Phytopathological Society, Beltsville, Md, U.S.A., February 26-27, 1959.] *Phytopathology*, **49** (8), 525.

In three varieties of soya bean (Laredo, Anderson and Adams) exposed to the root-knot nematode *Meloidogyne hapla* for periods of from seven to 56 days, there were differences in the rate of gall formation and egg-mass development and also in the numbers of larvae invading the roots. Adams appears to be the most efficient host from all these aspects. Growth of the apical meristem often ceased in invaded roots and numerous lateral roots arose from the region of the galls. No differences were observed between giant cells in each of the varieties.

A. M. Shepherd

268—SHER, S. A., 1959. [Department of Plant Nematology, University of California Citrus Experiment Station, Riverside, California, U.S.A.] "A root-lesion-nematode disease on *Cymbidium* orchids." *Phytopathology*, **49** (8), 458-460.

Sher reports the finding of *Pratylenchus scribneri* in the roots and "bulbs" of *Cymbidium* plants showing unthrifty growth from several nurseries and on one occasion from the roots of a *Cypripedium* plant. *Cymbidium* hybrid plants were grown in the green-house in soil infested with two population levels of *P. scribneri*. Inoculated plants examined after a year showed unthrifty growth with yellow outer leaves. In some cases roots were nearly destroyed and other roots had necrotic lesions from which *P. scribneri* could be obtained in all stages. Although the roots carried heavy infections of *P. scribneri* the nematodes could not always be recovered from associated soil. The disease is illustrated by photographs. Several named fungi were associated with the *Cymbidium* roots.

D. J. Hooper

269—TAYLOR, A. L., 1958. "Identificación de nemátodos parásitos en las plantas." **Turrialba**. **Costa Rica**, 8 (1), 28-33.

This is a very brief and very general key to the differentiation of plant-parasitic nematodes. It has a short introduction and some line drawings. J. B. Goodey

270—TAYLOR, D. P., 1959. [Dept. of Plant Pathology and Botany, Institute of Agriculture, University of Minnesota, St. Paul, U.S.A.] "The male of *Scutellonema brachyurum* (Steiner, 1938) Andrassy, 1958." **Proceedings of the Helminthological Society of Washington**, 26 (1), 51-53.

Taylor describes the previously unknown male of *Scutellonema brachyurum* (Steiner, 1938) Andrassy, 1958 from a population maintained on African violets (*Saintpaulia ionantha* Wendl.), host from which the parasites were originally obtained in St. Joseph, Minnesota, U.S.A. The sex ratio is about one male to two hundred females. The male possesses a single testis, cylindrical spermiduct, spicules about 24μ long, a gubernaculum about one third the length of the spicules and a conspicuous bursa. It differs from the male of *S. christiei* by the presence of four lines on the lateral field and opposed scutella on the tail and from *S. bradys* and *S. blaberum* by having only three or four striae on the lip region. W. G. Inglis

271—THOMAS, H. A., 1959. [A. and I. Citrus Center, Weslaco, Texas, U.S.A.] "On *Criconemoides xenoplax* Raski, with special reference to its biology under laboratory conditions." **Proceedings of the Helminthological Society of Washington**, 26 (1), 55-59.

Thomas obtained large numbers of *Criconemoides xenoplax* Raski from soil from peach orchards in New Jersey. He used these to inoculate peach seedlings grown in flats and produced populations for morphological studies on adults and larvae. He found that the larvae fell into three groups, based on body length, spear length and number of annules and suggests that these stages are probably associated with moults. The author is of the opinion that the larvae originally described by Raski were in the third stage, but in other respects his observations on the species correspond closely to those of Raski. Detailed descriptions of egg deposition and of feeding activity are also included. A. M. Shepherd

272—VAN GUNDY, S. D., 1959. [Dept. of Plant Nematology, University of California, U.S.A.] "The life history of *Hemicyclophora arenaria* Raski (Nematoda: Criconematidae)." **Proceedings of the Helminthological Society of Washington**, 26 (1), 67-72.

Van Gundy presents a detailed study of the life-history of *Hemicyclophora arenaria*, from green-house colonies reared on rough lemon and tomato. Points of interest are that: the first-stage larva has no stylet (this develops after the first moult within the egg); each subsequent larval stage, with one exception, must feed on a host root if it is to live and develop further; the exception is the fourth larval stage of the male which does not feed; the adult male does not possess a stylet; the adult female produces a sixth cuticle which is not a larval cuticle but represents an incomplete adult moult. R. D. Winslow

273—WHITE, J. H., 1959. "Stem and bulb eelworm attacking swedes." **Plant Pathology**, 8 (1), 37-38.

White describes and illustrates with photographs an attack by *Ditylenchus dipsaci* on swedes, *Brassica napus* L. var. *napobrassica*. Attacked plants had malformed cotyledons and leaves; petioles were thickened and the laminae were thick and brittle. The crop history of the field is given. None of the weeds growing in the field were found infected. Attempts to transfer *D. dipsaci* from swede to oats and vice versa were negative. D. J. Hooper

Insect-Parasitic Nematoda

See also Nos.: 66, 323.

274—DAVIES, D. M., 1959. [McMaster University, Hamilton, Ontario, Canada.] "Some parasites of Canadian black flies (Diptera, Simuliidae)." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, pp. 660-661. [Discussion p. 661.]

Davies points out that black-flies in Ontario are parasitized by microsporidia, mermithid nematodes and water mites. Mermithid larvae were found in larvae, pupae and male and female adults of various simuliid species from mid-April to late July. 15% to 60% of female

Prosimilium fuscum and *P. mixtum* in the oviposition flight in May were infected. This is probably the time when the mermithids return to the water. Microsporidia and mermithids are of little importance in the natural control of black-flies. Also the most important blood-sucking species are least attacked by water mites.

J. M. Watson

275—STEFANI, R., 1959. [Instituto di Zoologia dell'Università di Cagliari, Italy.] "Un nuovo parassita degli embiotteri (*Hexameris* sp.)." **Rivista di Parassitologia**, 20 (1), 29-32. [English summary p. 31.]

Stefani records the occurrence of a larval mermithid, *Hexameris* sp., from *Embia nuragia* and *E. tyrrhenica* in Sardinia. The recorded parasites, both internal and external, of Embioptera are reviewed.

W. G. Inglis

276—WELCH, H. E., 1958. "Test of a nematode and its associated bacterium for control of the Colorado potato beetle *Leptinotarsa decemlineata* (Say)." **Report of the Entomological Society of Ontario**, 88, 53-54.

Cultures of a nematode, related to *Neoplectana chresima* Steiner, and an associated bacterium were sprayed on to test plots of potato being defoliated by *Leptinotarsa decemlineata*. Significant reduction in beetle count occurred and the control, though small, merited further investigation.

J. B. Goodey

277—WELCH, H. E., 1958. [Entomology Laboratory, Belleville, Ontario, Canada.] "A review of recent work on nematodes associated with insects with regard to their utilization as biological control agents." **International Congress of Entomology** (10th), Montreal, 1956, Proceedings, Vol. 4, pp. 863-868.

Welch mentions two previous reviews by Sweetman (1936) and Steinhause (1949) and reviews work since then on nematodes associated with insects. Most of the work mentioned is taxonomic but some facts relating to possible biological control emerge. There are 63 references.

J. B. Goodey

Control

See also Nos.: 244, 255, 264.

278—GOFFART, H., 1957. "Der gegenwärtige Stand der Nematodenbekämpfung mit chemischen Mitteln." **Nachrichtenblatt des Deutschen Pflanzenschutzdienstes**. Stuttgart, 9 (5), 75-78. A survey of properties of the nematicides Shell D-D, ethylene dibromide, methyl bromide, chloropicrin, N244, N521, DCB-40, Nemagon, V-C 13 and Vapam is given. H. R. Wallace

Miscellaneous

No relevant abstracts in this issue

TAXONOMY

Monogenea

279—BRAVO HOLLIS, M., 1957. [Instituto de Biología, Universidad Nacional Autónoma de México, Mexico.] "Tremátodos de peces marinos de aguas mexicanas. XIV. Cuatro monogenos de la familia Capsalidae Baird, 1853, de las costas del Pacífico, incluyendo una especie nueva." **Annales del Instituto de Biología. Mexico**, 28 (1/2), 195-216.

The four monogenetic trematodes described and figured from fishes on the Pacific Coast are: *Benedenia adenea* from *Mycteroherca* sp., *M. pardalis* and *Scarus perrico*; *B. girellae* from *M. pardalis* and *Girella nigricans*; *Encotylabe pagrosomi* from *Pomadasys macracanthus*; and *Trochoporus pseudomarginatus* n.sp. from *Epinephelus analogus*. This new species differs from known *Trochoporus* in possessing only five rays in the opisthaptor which do not reach its edge; moreover, the rays corresponding to the first pair of hooks are not well differentiated. Bravo Hollis considers that *Megalocotyle trituba* Pratt & Aldrich, 1953 should be transferred to *Trochoporus* as *T. trituba* n.comb.

R. T. Leiper

280—ERGENS, R., 1959. [Biologický ústav ČSAV, parazitologie, Praha.] "K problému druhové samostatnosti *Dactylogyrus nybelini* Markevitsch, 1933 (Monogenoidea)." **Věstník Československé Zoologické Společnosti**, 23 (2), 156–160. [German summary p. 160.]

Ergens concludes, from an examination of the specimens found in 1957 in southern Czechoslovakia, that *Dactylogyrus nybelini* is a distinct species. The view that it is synonymous with *D. cornu*, as stated by Malevitskaya (1949) and by Markevič (1951), is not justified. Some of the differential characteristics are: the median hooks of *D. nybelini* are more massive than those of *D. cornu*; the connecting bar of the latter is somewhat arched, its anterior edge has a sharp incision, the posterior edge is regular and the lateral parts are bent backwards whereas the connecting bar of *D. nybelini* is bent more and the incision at the anterior edge is deeper; and the cirrus of *D. cornu* is funnel-like, whereas that of *D. nybelini* is enlarged at both ends. The dimensions of the two species are similar, but vary to a greater extent in *D. cornu* than in *D. nybelini*. *Chondrostoma nasus* is a new host for *D. nybelini*. N. Jones

281—HIDALGO ESCALANTE, E., 1958. [Laboratorio de Helmintología, Escuela Nacional de Ciencias Biológicas I.P.N.] "Hallazgo de una nueva especie de *Capsala*, *Capsala pricei* n.sp. (Trematoda, Monogenea) en un pez marino del puerto de Mazatlán, Sinaloa, México." **Anales del Instituto de Biología. Mexico**, 29 (1/2), 209–217. [English summary p. 216.]

Capsala pricei n.sp. from the fish *Makaira mitsukurii* from the Mexican Pacific has two large hooks on the opisthaptor. These are elongate and fusiform, with rounded ends, and are directed obliquely forwards. M. McKenzie

282—VOJTEK, J., 1958. [Zoologický ústav Masarykovy university, Brno.] "Dactylogyrus borealis Nybelin 1937, nový žábrohlíst pro faunu ČSR." **Československá Parasitologie**, 5 (1), 199–202. [German & Russian summaries pp. 201–202.]

Vojtek reports on the finding of *Dactylogyrus borealis* from *Phoxinus phoxinus* for the first time in Czechoslovakia. Most of the 35 specimens examined had the ventral processes of the median hooks larger than the dorsal processes, as described by Nybelin. However, 25% of the parasites had the ventral and dorsal processes of equal size. N. Jones

Aspidobothria

No relevant abstracts in this issue

Digenea

283—BRAVO H., M. & BRENES M., R. R., 1958. [Laboratorio de Helmintología, Instituto de Biología, Universidad Nacional de México.] "Tremátodos de peces marinos de aguas mexicanas. XV. Una nueva especie de *Multitestis* Manter, 1931, de la familia Allocreadiidae Stosich, 1904." **Anales del Instituto de Biología. Mexico**, 29 (1/2), 203–207.

Multitestis nasusi n.sp. from the fish *Menticirrhus nasus*, caught on the Pacific shores of Mexico, resembles *Multitestis inconstans* but the new species is distinguished by its transverse cirrus sac. M. McKenzie

284—CABALLERO Y C., E., 1957. [Instituto de Biología, Universidad Nacional Autónoma de México.] "Helmintos de la República de Panamá. XXII. Descripción de dos tremátodos de vertebrados marinos." **Revista de Medicina Veterinaria y Parasitología. Maracay**, 16 (1/4), 11–24. [English summary pp. 21–23.]

Pseudoparvumcreadium maris n.g., n.sp. is a new opecoelid from the marine fish *Hoplopagrus guntheri* caught in Panama. Its acetabulum is not divided into two lobes, which character distinguishes the new genus from *Parvacreadium*. In this paper there is also a redescription of *Phagicola longa*. M. McKenzie

285—CABALLERO Y C., E. & BRENES M., R. R., 1957. [Instituto de Biología, Laboratorio de Helmintología, Universidad Nacional Autónoma de México.] "Helmintos de la República de Costa Rica. VI. Algunos tremátodos de peces, reptiles y mamíferos." **Anales del Instituto de Biología. Mexico**, 28 (1/2), 217–240.

Ochoterenatrema costarricensis n.sp. from *Eptesicus propinquus* differs in various measurements from *O. labda*, the type species of the genus, and from *O. caballeroi*. It has a smooth ovoid

ovary and a characteristic pseudo-sucker of the cirrus. Other species described and figured from Costa Rica are *Tagia ecuadori* and *Bianium plicatum* from *Sphaeroides* sp., *Acanthostomum gnerii* from *Rhamdia rogersi*, *Telorchis pseudoaculeatus* from *Kinosternon cruentatum* and *Prosthodendrium (P.) cordiforme* from *Eptesicus propinquus*. R. T. Leiper

286—CABALLERO Y C., E. & BRENES M., R. R., 1958. [Laboratorio de Helmintología, Instituto de Biología, Universidad Nacional de México.] "Helmintos de la República de Costa Rica. VII. Tremátodos de algunos vertebrados salvajes, con descripción de una nueva especie de *Acanthostomum Looss, 1899.*" *Anales del Instituto de Biología. Mexico*, 29 (1/2), 165-179.

Caballero & Brenes report or describe from wild vertebrates in Costa Rica (i) *Acanthostomum acuti* n.sp. from *Crocodylus acutus acutus*, characterized by the arrangement of the reproductive organs and extension of the vitellaria, (ii) *Proterodiplostomum medusae*, (iii) *Cotylotretus grandis* and (iv) *Mesocelium travassosi*. They are of the opinion that *A. loossi* Pérez Vigueras and perhaps *A. unami* Peláez & Cruz correspond really to *A. scyphocephalum*. M. McKenzie

287—CABALLERO Y C., E., BRENES, R. R. & JIMÉNEZ-QUIRÓS, O., 1957. [Laboratorio de Helmintología, Escuela Nacional de Ciencias Biológicas I.P.N., Costa Rica.] "Helmintos de la República de Costa Rica. IV. Algunos tremátodos de animales domésticos y silvestres." *Revista de Biología Tropical. Costa Rica*, 5 (2), 135-155. [English summary pp. 147-148.]

Six species of digenetic trematodes are reported for the first time from Costa Rica. They are *Paramphistomum cervi* from *Bos taurus*, *Choledocystis intermedius* and *Gorgoderina megalorchis* from *Bufo marinus marinus*, *Urotrema scabridum* from a new host, the bat *Eptesicus propinquus*, *Rhopalias coronatus* and *R. horridus* from the opossum *Didelphis marsupialis etensis* and *Heronimus chelydrae* from the turtle *Kinosternon cruentatum*. M. McKenzie

288—CABALLERO Y C., E., ZERECERO Y D., M. C. & GROCOTT, R. G., 1958. [Laboratorio de Helmintología, Instituto de Biología, Universidad Nacional de México.] "Helmintos de la República de Panamá. XXI. Algunos tremátodos de quelonios de agua dulce. (2a. parte)." *Anales del Instituto de Biología. Mexico*, 29 (1/2), 181-202.

Concluding their study of some trematodes of terrestrial and fresh-water chelonians from Panama [for abstract of the first part of the work see Helm. Abs., 25, No. 345e], Caballero *et al.* describe the following species, all of which are new to Panama: *Helicotrema asymmetrica*, *Nematophila grande* and *Telorchis medius* from *Geoemyda melanosterna*, *Schizamphistomoides tabascensis* from *Pseudemys ornata*, *Heronimus chelydrae* from *Kinosternon panamensis* and *Telorchis corti* from both *P. ornata* and *K. panamensis*. Among the synonyms of *Nematophila grande*, the authors include *N. ovalis*, *Allassostoma venezuelensis* and *Paramphistomum argentinum*, which were created by Cordero & Vogelsang, 1940. M. McKenzie

289—HARKEMA, R. & MILLER, G. C., 1959. [Zoology Department, North Carolina State College, Raleigh, N.C., U.S.A.] "Studies on the helminths of North Carolina vertebrates. I. *Procyotrema marsupiformis* n.g., n.sp. (Strigeida: Diplostomatidae) from the pancreatic duct of the raccoon." *Journal of Parasitology*, 45 (2), 151-153.

Harkema & Miller describe and illustrate *Procyotrema marsupiformis* n.g., n.sp. from the pancreatic duct of *Procyon lotor*. The new strigeid is placed in the family Diplostomatidae. *Procyotrema* differs from *Duboisella* in the structure of the holdfast, the presence of pseudo-suckers, arrangement of testes, absence of ejaculatory pouch, and anterior position of the uterus. It is differentiated from *Pharyngostomum* and *Pharyngostomoides* by its large size, structure of the holdfast, and presence of the ventral pouch. E. I. Sillman

290—HŮRKOVÁ, J., 1959. [Department of Parasitology, Chair of Ecological Zoology, Charles University, Prague.] "Prosthodendrium (*Prosthodendrium*) *carolinum* n.sp. and some less known bat trematodes in ČSR." *Věstník Československé Zoologické Společnosti*, 23 (1), 23-33. [Czech summary p. 32.]

Hůrková, in a preliminary report on helminths from bats, gives the description of *Prosthodendrium (*Prosthodendrium*) *carolinum* n.sp.*, found in the intestine of six out of eight *Myotis daubentonii*. The new species differs from *P. (P.) longiforme* (Bhalerao, 1926), Dubois, 1955

in the post-acetabular position of the ovary, the smaller number of vitelline glands and the relatively smaller size of the organs. From *P. (P.) dinanatum* (Bhalerao, 1926) Dollfus, 1931 it differs mainly by the larger body size and relatively larger size of organs. Altogether 248 bats were examined from Bohemia, Moravia and the Slovakian Karst. In addition, six other trematode species were found, also of the family Lecithodendriidae. The following four are reported for the first time from Czechoslovakia: *P. (P.) ascidia*, from five out of seven specimens of *Myotis mystacinus*; *P. (P.) parvouterus*, from two out of ten *Miniopterus schreibersi*; *Parabascus* sp., from three out of eight *Myotis daubentonii*; and *Allassogonoporus amphoraeformis* from five out of seven *M. mystacinus*. The other species found were: *Prosthorhynchus (Prosthorhynchus) magnum*, from *Rhinolophus ferrumequinum* and *P. (P.)* sp. from *M. oxygnatus*.

N. Jones

291—KINGSTON, N. & FREEMAN, R. S., 1959. [School of Hygiene, University of Toronto, Canada.] "On the trematodes *Brachylecithum orfi* sp.nov. (Dicrocoeliidae) and *Tanaisia* sp. (Eucotylidae) from the ruffed grouse, *Bonasa umbellus* L." *Canadian Journal of Zoology*, 37 (2), 121-127.

Kingston & Freeman found 44 of 87 *Bonasa umbellus* examined to be infected with *Brachylecithum orfi* n.sp. The new form is described and illustrated; it differs from other members of the genus by (i) its greater length, (ii) the larger ratio of body width to body length, (iii) the longer testes, (iv) the smaller ratio of testes field to body length and (v) the extent and position of the vitelline field, which lies wholly or largely in the posterior half of the body. The molluscan intermediaries were shown to be *Zonitoides arboreus*, *Z. nitidus*, *Deroeras reticulatum*, *D. laeve* and *Cionella lubrica*. The seasonal incidence of the infection is discussed. *Tanaisia* sp. is recorded from eight of 77 ruffed grouse examined.

S. Willmott

292—PEARSON, J. C., 1959. [University of Queensland, Yerongpilly, Brisbane, Australia.] "Observations on the morphology and life cycle of *Strigea elegans* Chandler & Rausch, 1947 (Trematoda: Strigeidae)." *Journal of Parasitology*, 45 (2), 155-174.

Pearson records observations on the morphology and life-history of *Strigea elegans*, as taken from the small intestine of a new host, *Nyctea nyctea*, in southern Ontario. The adult is described rather completely in view of the fact that recovered specimens differed slightly from the original and subsequent descriptions. The life-history was determined experimentally as follows: (i) first intermediate host—*Gyraulus parvus*, from which cercariae first emerged 26 days after exposure to hatched miracidia; (ii) second intermediate host—tadpoles of *Bufo americanus*, *Rana sylvatica* and *R. clamitans*, in which cercariae developed to mesocercariae in about two weeks; (iii) third intermediate hosts—*Thamnophis sitalis* and young *Anas boschas*, in which mesocercariae developed into encysted, encapsulated tetracotyles in less than 21 days. When mesocercariae were fed to two fledgling *Bubo virginianus*, tetracotyles developed in the subcutaneous connective tissue and muscle fasciae. The author concludes that *S. elegans* has an obligatory four host life-cycle. The morphology of all larval stages is described and figured from experimental material.

E. I. Sillman

293—SOGANDARES-BERNAL, F., 1959. [Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Florida, U.S.A.] "Cleptodiscus kyphosi, a new trematode (Paramphistomatidae) in *Kyphosus sectatrix* (Linn.) from Bimini, B.W.I." *Journal of Parasitology*, 45 (2), 148-149, 150.

Sogandares-Bernal describes and illustrates *Cleptodiscus kyphosi* n.sp. (Paramphistomatidae) from the mid-intestine of *Kyphosus sectatrix*. The new species differs from *C. reticulatus* and *C. bulbosus* by possessing tandem anterior testes instead of testes oblique and posterior, uterus dextral to testes instead of intra-testicular, and genital pore sinistral rather than central. *C. kyphosi* further differs from *C. reticulatus* by possessing a spherical oesophageal bulb as compared with an oesophageal tube, and from *C. bulbosus* by lacking a strong band of sphincter muscles surrounding the anterior border of the pharynx.

E. I. Sillman

294—WINTER, H. A., 1957. [Laboratorio de Helmintología del Instituto de Biología, Universidad Nacional Autónoma de México, Mexico.] "Tremátodos de peces marinos de aguas mexicanas. XIII. Cuatro digenios de peces del Océano Pacífico, dos de ellos nuevas especies de la familia Cryptogonimidae Ciurea, 1933." **Anales del Instituto de Biología. México**, 28 (1/2), 175-194. [English summary p. 192.]

Four trematodes are described and figured from fishes caught off the Mexican Pacific Coast, viz., two known forms, *Lintonium vibex* from *Sphaeroides lobatus* and *Phyllodistomum carangis* from *Citula dorsalis* and the two new species, both Cryptogonimidae, named *Neochasmus magnus* n.sp. from *Lutianus colorado* and *Metadena lopastoma* n.sp. from *Hoplopagrus guntheri*. *N. magnus* has a greater number (34 to 36) of peri-oral spines than *N. microvata* and *N. ictaluri* and the vitellaria are more restricted than in *N. labeosus*. It is also larger than the other species of this genus. *M. lopastoma* has an oral sucker 6.5 times the width of the acetabulum, is much larger than that of other species and the caeca extend to near the posterior end of the body.

R. T. Leiper

Cestodaria

See No. 298.

Cestoda

See also Nos.: 40, 237, 388.

295—FLORES-BARROETA, L., HIDALGO-ESCALANTE, E. & BRENES, R. R., 1958. [Laboratorio de Helmintología, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, México D.F.] "Cestodos de vertebrados VI." **Revista de Biología Tropical. Costa Rica**, 6 (2), 167-188. [English summary pp. 186-187.]

Flores-Barroeta *et al.* record three tapeworms from Mexico and Costa Rica. Several complete worms from *Pelecanus occidentalis carolinensis* Gm. in Mexico, are described, with seven text figures; in the discussion, which emphasizes the importance of histological examination, they are ascribed to *Tetrabothrius sulae* (Baird, 1853) Baer, 1954 on the basis of the structure and mutual relations of the male and female genital ducts and the genital atrium, the number of testes and the size of the scolex. A specimen from *Bradyurus griseus griseus* (Gray) in Costa Rica is described, with five text figures, as *Moniezia benedeni* (Moniez, 1874) Blanchard, 1891 and reasons for this identification are given. An historical account of the species of *Moniezia* described to date follows, with a discussion of specific characters, such as the type of intersegmental glands, the arrangements of the testes, the anatomy of the mature proglottis, and of characters which distinguish the genus from *Cittotaenia* Riehm, 1891. *Taenia laticollis* Rudolphi, 1819 from *Urocyon cinereoargenteus costaricensis* Goodwin in Costa Rica and *T. taeniaeformis* (Batsch, 1786) Wolffüghel, 1911 from *Felis wiedii nicaraguensis* (Allen) also in Costa Rica are described and the rostellar hooks figured; the former is compared with Skinker's (1935) redescription of the species from European and North American *Lynx*. Wide individual variation in anatomical characters makes accurate identification difficult in the absence of the larval stages and, as gravid segments were absent, the rostellar hooks are most important. There is little difference between the mature segments of the two species, but considerable difference in the shape and size of the hooks. There are 25 references.

J. Mahon

296—HAMILTON, Jr., W. J., & SCHAD, G. A., 1951. [Department of Conservation, Cornell University, Ithaca, New York.] "Parasitism of unweaned shrews by the cestode *Hymenolepis falculata*." **Canadian Journal of Zoology**, 37 (3), 377.

Hamilton & Schad examined three *Sorex cinereus cinereus* nestlings, 15 to 16 days old and not yet weaned. They were found with two other nestlings and their mother. 13 scoleces and 17 to 18 strobila of *Hymenolepis falculata* were found. It is suggested that the young were infected by feeding from the anus of their parent. These cestode specimens differed from *H. falculata* Rausch & Kuns by the presence of ten instead of twelve hooks. N. Jones

297—RYŠAVÝ, B., 1957. [Biologický ústav ČSAV, parazitologie, Praha.] "Další poznatky o helminto-fauně ptáků v Československu." *Československá Parazitologie*, 4, 299–329. [German & Russian summaries pp. 324–326.]

Ryšavý describes and figures *Anonchotaenia magniuterina* n.sp. from the intestines of *Passer domesticus* and *Parus atricapillus*. The new species possesses 16–20 testes, localized on both sides of the proglottis as well as its lower side and forming two separate groups. An oval or spherical uterus occupies a large portion of the proglottis. The uterus somewhat resembles that of *Anonchotaenia* sp. Dubinina, 1950, but differs from it in the larger size of the paruterine organ, which is immediately above the uterus. 618 specimens of birds, belonging to 72 species from the entire territory of Czechoslovakia, were examined. As a result of this study ten species of trematodes, 25 species of nematodes, 28 species of cestodes and six Acanthocephala were found, most of which are described and many figured. The greatest incidence of infection (up to 41%) was in *Turdus merula*. Of the total number of birds examined, 21% were found to be infected with cestodes, 12% with nematodes, 7.8% with trematodes and 2.75% with Acanthocephala.

N. Jones

298—SPASSKI, A. A., 1958. [Gelmintologicheskaya laboratoriya Akademii Nauk SSSR, Moskva.] [Short analysis of the classification of cestodes.] *Československá Parazitologie*, 5 (2), 163–171. [In Russian.]

Spasski analyses the Cestoda and Cestodaria as subclasses of Cestoidea. In Cestodaria only the order Amphiliinidea is left with the family Amphiliinidae Braun, 1883. The order Biporophyllidea Subramanian, 1939 is suppressed as incorrectly described. The order Gyrocotylidea was not created by Wardle but by Poche, 1925. Of the 11 orders of Cestoda listed by Wardle & McLeod, 1952 the following are recognized: Tetraphyllidea, Trypanorhyncha, Cyclophyllidea and Pseudophyllidea. The orders Proteocephala, Disculicepitidea, Lecanicephala (all erected by Wardle & McLeod in 1952) and Nippotaeniidae Yamaguti, 1939 are included in the order Tetraphyllidea (Beneden, 1849) Carus, 1863. Lecanicephalidae Braun, 1900 is made a synonym of Tetraphyllidae. The latter is united with Cephalobothriidae Pintner, 1928 into superfamily Lecanicephaloidea Southwell, 1930. This superfamily is placed in Tetraphyllata (=Phyllobothriata). The other representatives of this suborder are placed in the superfamily Phyllobothrioidea Southwell, 1930 with two families: Phyllobothriidae (Ariola, 1899) Braun, 1900 and Onchobothriidae Braun, 1900. *Apora dogieli* is renamed *Gastrotaenia dogieli* (Ginetsinskaya, 1944) n.comb. Order Aporidea Fuhrmann, 1933 is again considered a synonym of Cyclophyllidea. Spasski suppresses Eucyclophyllidea and Heterocyclophyllidea, proposed by Wolffhügel (1938). Heterocyclophyllidea Wolffhügel is made a synonym of the suborder Anoplocephalata Skryabin, 1933. *Gastrotaenia* is placed in Hymenolepididae, subsequently the family Nematoparataeniidae Poche, is excluded again. Orders Caryophyllidea Carus, 1863 and Spathebothriidea Wardle & McLeod 1952 are regarded as constituents of the order Pseudophyllidea (Beneden, 1849) Carus, 1863. The order Tetraphyllidea is subdivided into four suborders, namely: Proteocephalata Spasski, 1957, Tetabothriata (Ariola, 1899) Skryabin, 1940, Phyllobothriata nom.nov. for Tetraphyllata Spasski, 1957 and Nippotaeniata Spasski n.subordo. The order Cyclophyllidea is subdivided into suborders: Anoplocephalata Skryabin, 1933 (=Cyclophyllacantha Mola, 1929), Taeniata Skryabin & Shults 1937 and Mesocestoidata Skryabin, 1940.

N. Jones

299—SPASSKI, A. A. & MOROZOV, Y. F., 1959. [Gelmintologicheskaya laboratoriya Akademii Nauk SSSR, Moskva.] [New hymenolepidids from insectivores.] *Věstník Československé Zoologické Společnosti*, 23 (2), 182–191. [In Russian.]

Spasski & Morozov describe three new hymenolepidids from insectivores. (i) *Skrjabina-canthus diplocoronatus* n.g., n.sp., from the intestine of *Sorex vir* in the Tomsk region, possesses a rostellum with a sheath and 34 similar hooks arranged in two crowns. The handle of the hooks is shorter than the blade. The basal process is well developed and a little shorter than the handle. The numerous proglottides have genital pores on one side only. The disposition of the three testes is megalopsoid. The cirrus sac as a rule does not intersect the median line. External and internal seminal vesicles are present, whereas auxiliary copulatory organs are absent. Ovaries are lobed and lie on the median line. The mature uterus is in the

form of a sac. The dimensions are 30 mm. by 0.17 mm. (ii) *Skrjabinacanthus jacutensis* n.sp. from *Sorex* sp. and *S. tscherskii*, differs mainly from the preceding species in the number of rostellar hooks, 13-14 in each of the two crowns, and by the smaller size. (iii) *Linolepis skrjabini* n.sp., from *Sorex araneus*, differs from *L. parva* in having larger hooks and by living in a different zoogeographical subregion (Palearctic). It has a short rostellum armed with eight well developed hooks, of which the blade is approximately the size of the handle. The basal process is well developed, but markedly shorter than the blade. The authors, on the basis of the arrangement of the genitalia and the number of hooks, conclude that *Hymenolepis sengeri* Neiland, 1933 belongs to *Linolepis*, which is reconstituted as follows: (i) *Linolepis parva* (Rausch & Kuns, 1950) Spasski, 1958, synonyms *Hymenolepis parva* Rausch & Kuns, 1950 and *H. lineola* Oswald, 1951; (ii) *Linolepis sengeri* (Neiland, 1953) n.comb., synonym *H. sengeri* Neiland, 1953; (iii) *Linolepis skrjabini* Spasski & Morozov. N. Jones

Acanthocephala

300—WARD, H. L., 1959. [Department of Zoology and Entomology, University of Tennessee, Knoxville, Tenn., U.S.A.] "The status of the acanthocephalan genus *Centrorhynchus*." *Journal of Parasitology*, 45 (2), 149.

Ward calls attention to the fact that *Centrorhynchus* Luehe, 1911, still stands as a valid acanthocephalan genus. E. I. Sillman

Nematoda

See also Nos.: 270, 277, 370, 424.

301—ANDERSON, R. C., 1959. [Department of Parasitology, Ontario Research Foundation, Toronto 5, Ontario, Canada.] "The taxonomy of *Dipetalonema spirocauda* (Leidy, 1858) n.comb. (= *Skrjabinaria spirocauda*) and *Dirofilaria roemeri* (Linstow, 1905) n.comb. (= *Dipetalonema roemeri*)."
Canadian Journal of Zoology, 37 (4), 481-493.

Anderson redescribes *Filaria spirocauda* Leidy, 1858 and refers it to *Dipetalonema*. *Skrjabinaria*, to which the species was referred by Lubimov (1927) falls as a synonym of *Dipetalonema* and *S. heteromorpha* Kreis, 1953 falls as a synonym of *D. spirocauda*. The only authentic records of *Dirofilaria immitis* in seals are from *Zalophus californianus*; *D. fausti* is considered to be a synonym of *D. immitis*. *D. spirocauda* is distinct in lacking termino-lateral wing-like appendages and bands of rod-like structures on the ventral surface of the male tail. *Dirofilaria roemeri* (Linstow, 1905) is described from a kangaroo as a new combination having formerly been referred to the genus *Dipetalonema*. The species is characterized by very small spicules and smooth cuticle without lateral alae. *Filaria websteri* Cobbald, 1879 is treated as a *nomen nudum*. W. G. Inglis

302—ANDERSON, R. C. & DÍAZ-UNGRÍA, C., 1959. "Revisión preliminar de las especies de *Thelazia* Bosc (Spiruroidea: Thelaziidae), parásitos de aves." *Memorias de la Sociedad de Ciencias Naturales La Salle*, 19 (52), 37-75. [English summary p. 73.]

Anderson & Díaz-Ungría present a preliminary revision of the 22 species of the genus *Thelazia* Bosc, 1819 (Nematoda). *T. anolabiata* (Molin, 1860), *T. digitata* Travassos, 1918, *T. philippinensis* Wehr, 1930, *T. aquilina* Baylis, 1934, *T. longicaudata* Sandground, 1933, *T. annamensis* Sandground, 1933, *T. buteonis* Herde, 1942, *T. depressa* Baylis, 1920 and *T. tejerai* n.sp. are fully described. The new species is from *Monasa atra* in Venezuela. It most closely resembles *T. chungkingensis*, from which it differs in having the walls of the buccal cavity straight and relatively narrow. Several species are considered indistinguishable, thus (synonyms in parentheses): *T. anolabiata* (= *lutzi*); *T. digitata* (= *anadorhynchi*); *T. aquilina* (= *chui* = *spizaeti* = *platyptera*); *T. philippinensis* (= *dentifera*) and *T. depressa* (= *lissotis*). The following are regarded as *species inquirendae*: *T. campanulata*, *T. caprimulgi*, *T. cirrura*, *T. digiticaudata*, *T. longicaudata*, Schuurmans-Stekhoven; *T. papillosa*, *T. pittae*

and *T. stereura*. A key is given in Spanish and English to the 14 species which appear to be valid at present. It is pointed out that the species of *Thelazia* parasitizing birds resemble the species in mammals in that they show little host specificity.

W. G. Inglis

303—BROWN, G. L., 1959. [Nematode Section, Entomology Laboratory, Ottawa, Canada.] "Three new species of the genus *Paratylenchus* from Canada (Nematoda: Criconematidae)." **Proceedings of the Helminthological Society of Washington**, 26 (1), 1-8.

Brown describes and figures three species of *Paratylenchus* from Canada. *P. aciculus* n.sp., associated with roots of *Poa palustris*, is characterized by its long spear ($67\ \mu$), the possession of three incisures and a vulva at c. 70%. *P. aculentus* n.sp. is similar to the first species in number of incisures and position of vulva c. 72% but it has a shorter spear, lacks conspicuous lips and has a broader tail in both sexes. *P. aculentus* was associated with roots of various grasses—*Bouteloua gracilis*, *Calamagrostis canadensis* and *Muhlenbergia mexicana*. *P. audriellus* n.sp. has a claw-like tail tip. The females of all three species have relatively long spears but the males lack spears. The last-named species was associated with roots of *Fagus grandifolia*, *Populus tremuloides* and *Prunus pensylvanica*. Brown points out the close relationship of all the species to *Cacopaurus*.

J. B. Goodey

304—CAMPANA-ROUGET, Y., 1959. "Les structures céphaliques des spirurides parasites de poissons et leur classification." **International Congress of Zoology** (15th), London, July 16-23, 1958. Proceedings, p. 683. [Discussion p. 683.]

This paper describes work which has been carried out on the head structures of Spiruridae parasitic in fish. The following conclusions are drawn: (i) *Rhabdochona* and *Johnstoniawsonia* belong to the Thelaziidae and might be included in a subfamily Rhabdochoninae; (ii) *Cystidicola*, *Metabronema*, *Ascarophis*, *Parascarophis*, *Cystidicoloides* and *Spinitectus* are indubitably spirurids and should be included in the subfamily Cystidicolinae, emended and transferred from the Thelaziidae to the Spiruridae; (iii) the classification of these forms should rest, not upon head structures alone, but also upon biological and other morphological characters. It is understood that a full account will be published elsewhere.

J. M. Watson

305—CAVENESS, F. E., 1959. [Dept. of Plant Pathology, South Dakota State College, Brookings, South Dakota, U.S.A.] "Trophurus minnesotensis (Caveness, 1958), n.comb." **Proceedings of the Helminthological Society of Washington**, 26 (1), 64.

Caveness places his genus *Clavaurotylenchus* as a synonym of *Trophurus* Loof, 1956 and makes the new combination *Trophurus minnesotensis* (Caveness, 1958) Caveness, 1959. He distinguishes this species from *T. sculptus* by the elongate-ovate basal oesophageal bulb, and the presence of a hemizonid 3-5 annules behind the excretory pore.

J. B. Goodey

306—CHABAUD, A. G., 1957. [Institut de Parasitologie de la Faculté de Médecine de Paris.] "Sur la systématique des nématodes du sous-ordre des Ascaridina parasites des vertébrés." **Bulletin de la Société Zoologique de France**, 82 (2/3), 243-253.

Chabaud proposes a new classification of the nematode suborder Ascaridina based on a combination of morphological and biological characters. He divides the suborder into five superfamilies, Cosmocercoidea, a primitive group from which the Ascaridoidea, Heterakoidea and Subuluroidea have arisen and the fifth superfamily the Oxyuroidea which he considers to have arisen separately from some rhabditoid-like ancestral form. The superfamilies are further subdivided into families, subfamilies and genera as follows: Cosmocercoidea: Cosmocercidae with Cosmocercinae (eight genera), Atractinae (four genera) and Gyrinicolinae (one genus); Kathlaniidae with Kathlaniinae (five genera). Ascaridoidea: Heterocheilidae with Anisakinae (27 genera) and Heterocheilinae (two genera); Ascarididae (nine genera). Heterakoidea n.superf.: Heterakidae with Schneidernematinae (one genus), Lauroiinae (one genus), Aspidoderinae (two genera) and Heterakinae (seven genera); Ascaridiidae (one genus). Subuluroidea: Quimperiidae with Quimperiinae (six genera); Subuluridae with Leipoaneminae n.subf. (one genus) and Subulurinae (four genera); Dubioxyuridae with Dubioxyurinae (one genus) and Maupasininae (one genus). Oxyuroidea: Thelastomatidae (not treated in detail); Rhigonematidae (not treated in detail); Oxyuridae with Pharyngodoninae (15 genera) and Oxyurinae (25 genera). 23 genera are listed as *incertae sedis*.

W. G. Inglis

307—CHABAUD, A. G., 1959. [Institut de Parasitologie, Faculté de Médecine, Université de Paris.] "Phénomène d'évolution régressive des structures céphaliques et classification des nématodes Spiruroidea." **Parassitologia. Rome**, 1 (1), 11–20.

Chabaud argues that the terrestrial Spirurinae (Nematoda) are primitive forms and that the aquatic Spirurinae are highly evolved forms. He further points out the fairly frequent occurrence of a regression during development of the structures of the head and argues that the Thelaziidae cannot be considered primitive as was done by Chitwood & Wehr (1934). As a result he presents a new classification of the Spiruroidea: (a) Thelaziidae with three subfamilies, (i) Thelaziinae—*Thelazia*, *Oxyspirura*, *Hempelia* and *Ceratospira*; (ii) Rhabdochoninae—*Rhabdochona* and *Johnstonmawsonia*; (iii) Pneumospirurinae—*Pneumospirura*, *Metathelazia* and *Vogeloides*: (b) Spiruridae with four subfamilies: (i) Ascaropsinae—*Pygarginema*, *Physocephalus*, *Streptopharagus*, *Simondsia*, *Leiuris*, *Ascarops* and *Paraleiuris*; (ii) Gongylone-matinae—*Gongylonema*; (iii) Rictulariinae—*Rictularia*, *Echinonema*, *Pneumonema* and *Rictularioides*; (iv) Spirurinae—*Mastophorus*, *Protospirura*, *Hartertia*, *Mazzia*, *Paraspirura*, *Spirura*, *Didelphonema*, *Vigispirura*, *Cyatospirura*, *Spirocerca*, *Cylicospirura* and *Petrowo-spirura*: (c) Hedruridae with four subfamilies: (i) Salobrellinae—*Salobrella*; (ii) Habrone-matinae—*Chitwoodspirura*, *Sicarius*, *Gendrespirura*, *Excisa*, *Cyrnea*, *Habronema*, *Odonto-spirura*, *Hadjelia*, *Histiocephalus*, *Parabronema*, *Draschia*, *Cheilonematodum* and (?) *Thylaconema*; (iii) Hedrurinae—*Hedruris*; (iv) Cystidicolinae—*Cystidicola*, *Spinitectus*, *Cystidi-coloides*, *Ascarophis*, *Parascarophis* and *Metabronema*. Keys are given to the subfamilies.

W. G. Inglis

308—CHABAUD, A. G. & BRYGOO, E. R., 1958. [Institut de Parasitologie, Faculté de Médecine, Université de Paris, Paris VI^e.] "Sur un nouveau nématode habronème parasite de rapaces, à Madagascar." **Mémoires de l'Institut Scientifique de Madagascar. Série A. Biologie Animale**, 12, 127–138.

Chabaud & Brygoo describe *Cyrnea (Procyrnea) dolichocolpos* n.sp. from *Gymnogenys radiatus* in Madagascar. The species is characterized by the extreme length of the spicules, the length of the ovejector, the distribution of the cloacal papillae and the presence of three large teeth on the pseudo-labia. A key is given for the 25 species of the subgenus *Procyrnea*. It is suggested that *C. excisiformis* Yamaguti, 1935 is probably indistinguishable from *C. ficheuris* Seurat, 1916. *C. circi* (Li, 1934) is considered a synonym of *C. leptoptera* (Rudolphi, 1819).

W. G. Inglis

309—CHABAUD, A. G. & BRYGOO, E. R., 1958. [Institut de Parasitologie, Faculté de Médecine, Université de Paris, Paris VI^e.] "Description et cycle évolutif d'*Aplectana courdurieri* n.sp. (Nematoidea, Cosmocercidae)." **Mémoires de l'Institut Scientifique de Madagascar. Série A. Biologie Animale**, 12, 159–176.

Chabaud & Brygoo describe the morphology and the life-history of *Aplectana courdurieri* n.sp., a parasite of *Rana (Ptychadena) mascareniensis* in Tananarive, Madagascar. The species is characterized particularly by the form of the male tail on which there is a slight excavation anterior to the cloacal opening, the posterior lip of the cloaca carries fine denticulations and the anterior lip bears seven papillae. The spicules are equal and identical with their posterior ends surrounded by fine membranes. The larval stages are described in detail and infection of the frog is by the mouth. Attempts to infect through the skin were unsuccessful. Most of the larvae ingested developed quickly in the intestine but some migrated into various other organs where they remained alive. There is no intermediate host. This life-history is compared with that of *Cosmocercoides variabilis* and is considered to be more specialized. It is concluded that the biology of the Cosmocercoida supports the view, suggested by their morphology, that they form a group from which the ascaridoids and oxyuroids have originated.

W. G. Inglis

310—CHABAUD, A. G. & PETTER, A. J., 1958. [Institut de Parasitologie, Faculté de Médecine de Paris.] "Les nématodes parasites de lémuriens malgaches." **Mémoires de l'Institut Scientifique de Madagascar. Série A. Biologie Animale**, 12, 139–158.

Chabaud & Petter report on the nematode parasites of lemurs in Madagascar. *Callistoura brygooi* n.g., n.sp. is described from *Lemur macaco*. The genus is characterized by a mouth with six lips, a cephalic vesicle, a short oesophagus with a distinct pharynx and a non-valvulate

posterior bulb, a very complex male tail with cuticular blades, a genital cone with finger-like processes, a distinct tail, and a single spicule. The genus is referred to the Oxyurinae. *Enterobius lemuris* Baer, 1935 is reported from *Lemur macaco* and the male tail is figured for the first time. *Subulura otolicii* is reported from a *Cheiogalpus* sp. from the Jardin des Plantes in Paris; *Rictularia alphi* is reported from the same host and also from *Lemur macaco* at the Jardin des Plantes. It is redescribed with a report on the variation in the species. *Dirofilaria pauliani* n.sp. is described from a female specimen found in *Propithecus verreauxi* at Behara, Madagascar. The species is characterized by the extreme posterior position of the vulva and by the presence of a small cuticular ring at the anterior end of the oesophagus. A list of all the species of nematodes reported from Madagascan lemurs is given.

W. G. Inglis

311—CHABAUD, A. G. & PETTER, A. J., 1959. [Institut de Parasitologie, Université de Paris, Faculté de Médecine, Paris, VI^e.] "Essai de classification des nématodes Acuariidae." *Annales de Parasitologie Humaine et Comparée*, **34** (3), 331-349.

Chabaud & Petter propose a new classification of the Acuariidae based on a synthesis of the adult morphology, the larval morphology and the speed of development within the intermediate host. The genus *Yseria* Gedoelst, 1919 is a synonym of *Streptocara* Railliet, Henry & Sisuff, 1912—as was pointed out by Gedoelst & Liégeois (1922). *Y. coronata* and *Y. quadripartita* are referred to the genus *Ancyracanthopsis* as new combinations. The family is divided into three subfamilies, thus: Acuariinae with 13 genera, *Paracuaria*, *Skrjabinocerca*, *Acuaria*, *Cheilospirura*, *Syncuaria* (with three subgenera *Syncuaria*, *Chordcephalurus*, *Skrjabinocara*), *Chevreuxia*, *Pectinospirura*, *Skrjabinoclava*, *Echinuria*, *Stammerinema*, *Synhimantus* (with three subgenera *Dispharynx*, *Synhimantus*, *Desportesius*), *Cosmocephalus* and *Sexansocara*; Seuratinae with seven genera, *Stegophorus*, *Streptocara*, *Rusguniella*, *Aviculariella*, *Proyseria*, *Paryseria* and *Seuraria*; Schistorophinae with nine genera, *Schistorophus* (= *Quasithelazia* = *Antennocara*), *Sciadiocara*, *Viktorocara*, *Ancyracanthopsis* (= *Skrjabinobronema* = *Parahistiocephalus*), *Schistogendra*, *Krusadia*, *Viguiera*, *Serticeps* and *Torquatella*. A key is given for the separation of the subfamilies and genera.

W. G. Inglis

312—CHABAUD, A. G. & ROUSSELOT, R., 1957. "Description d'un nématode habronème: *Cyrnea (Cyrnea) antennifera* n.sp., intéressant par ses caractères céphaliques." *Bulletin de la Société Zoologique de France*, **82** (5/6), 420-429.

Chabaud & Rousset describe two male and one female *Cyrnea antennifera* n.sp., from the crop of *Francolinus coquilynesi* from the zoological park at Brazzaville, French Equatorial Africa. *C. antennifera* belongs to the sub-genus *Cyrnea* and is distinguished from other species by the presence of a bifid chitinoid formation (neodonta) on the summit of each pseudo-lip; in other species such formations are on the anterior edge of the pseudo-lips and are tooth-like, not antenniform. The positions of the neodonta and the three normal teeth in *C. antennifera* are considered to be intermediate between the condition in the primitive and the further evolved species of the genus, and to favour the hypothesis of a progressive invagination of the pseudo-lips during the evolution of the Habronematinae. A dichotomous key to the subgenus *Cyrnea* is given which leads to species, or, in cases where it is thought possible that some names are synonyms, to groups of species. The list of species and groups is (i) *C. casuarii* (Maplestone, 1932); (ii) *C. semilunaris* (Molin, 1860) with *C. piaya*; (iii) *C. indica* (Maplestone, 1929) with *C. capitellata*, *C. coraci* and *C. thapari*; (iv) *C. diesingi* (Maplestone, 1932); (v) *C. bulbosa* (Linstow, 1906); (vi) *C. lyuri* Fedyushkin, 1946; (vii) *C. antennifera* n.sp.; (viii) *C. colini* (Cram, 1927); (ix) *C. eurycerca* Seurat, 1914 with *C. euplocami* and *C. graphophasiani*; (x) *C. parroti* Seurat, 1917 with *C. numidae* and *C. seurati* (sensu López-Neyra, 1918).

W. A. F. Webber

313—GUPTA, S. P., 1959. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Nematode parasites of vertebrates of East Pakistan. I. Oxyuridae from lizards (*Gekko* and *Hemidactylus*)." *Canadian Journal of Zoology*, **37** (4), 469-475.

Gupta describes *Pharyngodon kuntzi* n.sp. from the large intestine of geckos (*Gekko gecko*) from Dacca, East Pakistan. The species differs from *P. megalocerca* (Skryabin, 1916) in the shape of the body; from *P. geckinis* Liu & Wu, 1941 in the absence of a spicule and from the

other species in the genus which do not have a spicule by the form of the female tail. *Pharyngodon frenatus* n.sp., from the large intestine of *Hemidactylus frenatus* from Dacca, East Pakistan, also has no spicule and the papillae on the male tail are included in the caudal alae. The species is distinct in that the vulva and excretory pore are contiguous and the female tail non-spiny, in the shape of the female tail and in that the excretory pore and vulva are anterior to the posterior end of the oesophagus. A single female *Thelandros* sp. is recorded from *Gekko gecko* at the same locality as the other species.

W. G. Inglis

314—GUPTA, S. P., 1959. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Nematode parasites of vertebrates of East Pakistan. II. *Amplicaeum ranae* sp.nov. (Heterocheiliidae Railliet & Henry, 1915) from Amphibia." *Canadian Journal of Zoology*, 37 (4), 477-479.

Gupta describes *Amplicaeum ranae* n.sp. from the intestine of *Rana tigrina* and *R. cancrivora* at Dacca, East Pakistan. [No type host is nominated.] The species closely resembles *A. cacopi* Chatterji, 1936, from which it differs in the presence of a median papilla, in having subequal spicules, in not having well developed caudal alae on the male tail, and in the lack of interlabia on the head.

W. G. Inglis

315—HARTWICH, G., 1959. [Zoologisches Museum der Humboldt-Universität, Berlin N 4, Invalidenstr. 43.] "Zur systematischen Stellung von *Belanisakis ibidis* Maplestone 1932 (Nematoda: Ascaridoidea)." *Zeitschrift für Parasitenkunde*, 19 (2), 209-210.

Hartwich reports that *Belanisakis ibidis* Maplestone, 1932 is referable to the genus *Porrocaecum* Railliet & Henry, 1912. *Belanisakis* is therefore a synonym of *Porrocaecum*, and *P. ibidis* is a new combination.

W. G. Inglis

316—KRUIDENIER, F. J. & MEHRA, K. N., 1959. "Aspiculuris ackerti n.sp., (Nematoda: Oxyuridae) from the wood rats of Arizona." *Proceedings of the Helminthological Society of Washington*, 26 (2), 147-150.

Kruidenier & Mehra describe *Aspiculuris ackerti* n.sp. from *Neotoma albigena* and *N. cinerea* at Coconino County, Arizona. The species shows sexual dimorphism in the form of the lips. There are three simple lips in the females while each lip of the three in the male is partly divided into two so that there is a superficial appearance of six lips in three groups of two. The species is characterized in addition by the gradual posterior attenuation of the cervical alae and the caudal alae, stopping some distance in front of the tip of the male tail.

W. G. Inglis

317—MYERS, B. J., 1959. [Institute of Parasitology, McGill University, Macdonald College P.O., Quebec, Canada.] "Phocanema, a new genus for the ainsakid nematode of seals." *Canadian Journal of Zoology*, 37 (4), 459-465.

Myers erects a new genus *Phocanema* of subfamily Anisakinae (Nematoda) for *Ascaris decipiens* Krabbe, 1878. This is the only species referred to the genus and was previously considered to belong in the genus *Porrocaecum* or the genus *Terranova*. The new genus is characterized by: the presence of dentigerous ridges; the lack of interlabia and teeth; the excretory pore opening at base of lips; no cervical alae; the ventriculus in form of a pseudobulb; the presence of an intestinal caecum; subequal spicules and three post-cloacal dentigerous ridges. The synonymy of the species and a list of its known hosts are given. It is pointed out that the hosts of the genus *Porrocaecum* are birds while those of *Terranova* are elasmobranchs.

W. G. Inglis

318—PELÁEZ, D. & PÉREZ REYES, R., 1958. [Laboratorio de Parasitología, Escuela Nacional de Ciencias Biológicas, I.P.N., México, D.F.] "Piratuba prolifica nov.sp., parásita de un *Sceloporus* mexicano (Nemat. Filar.)." *Anales de la Escuela Nacional de Ciencias Biológicas*, Mexico, 9 (1/4), 49-59. [English summary p. 59.]

Peláez & Reyes describe a new species of filaria, *Piratuba prolifica* n.sp., from the peritoneal cavity of *Sceloporus mucronatus omiltemanus* collected at Omiltemi, Mexico. Microfilariae were found circulating in the blood and are described. The species differs from the type (and previously the only) species of the genus, *P. digiticauda*, in the number of caudal papillae and in the proportions of the body.

W. G. Inglis

319—PETTER, A. J., 1958. [Institut de Parasitologie, Faculté de Médecine de Paris.] "Filaria sergenti Mathis et Leger 1909, parasite d'un nycticèbe (*Nycticebus tardigradus* Link), appartient au genre *Breinlia* Yorke et Maplestone, 1926." *Bulletin de la Société Zoologique de France*, 83 (5/6), 423-429.

Petter redescribes *Filaria sergenti* Mathis & Leger, 1909 (Nematoda) from specimens recovered from a *Nycticebus tardigradus* from Calcutta which had been in the zoo in Paris for two months. As a result the species is referred to the genus *Breinlia* Yorke & Maplestone, 1926 in which genus it most closely resembles *B. thylogali* (Mackerras, 1954) differing in a shorter left spicule, the structure of the right spicule and the number of caudal papillae. The relationships between *Breinlia* and *Dipetalonema* are discussed and it is concluded that these genera are distinct.

W. G. Inglis

320—SANWAL, K. C., 1959. [Nematode Section, Entomology Laboratory, Ottawa, Canada.] "Cuticonema vivipara n.g., n.sp., a new saprophagous nematode of the subfamily Panagrolaiminae Thorne, 1937, from Canada, with a note on the genus *Brevibucca* Goodey, 1935." *Canadian Journal of Zoology*, 37 (3), 223-229.

Cuticonema vivipara n.g., n.sp. is described and figured. It was associated with the roots of a fallen oak tree in Ottawa. The body retains the last larval cuticle which is striated but without incisures. The inner cuticle of the adult is similar but also has longitudinal rows of punctations and a dorsal and ventral row of pores. The six lips are pointed and separated by deep grooves, with cuticularized edges. The amphids are largish and oval and lie at the base of the lateral lips. The stoma and oesophagus are panagrolaimoid. The vulva is posterior and is covered by a cuticular pouch. The female gonad is single, prodelphic, and the ovary reflexed. The male has unequal spicules, a gubernaculum and a prodelphic gonad not reflexed. The tails of both sexes are shortish, tapering to a narrow point. The male tail has seven pairs of papillae. Sanwal discusses his reasons for placing the genus in Panagrolaiminae and points out the dissimilarities between the two species of *Brevibucca*. He suggests that it may be advisable to split this genus into two—*Brevibucca* Goodey, 1935 with *B. saprophaga* as type and another genus (*incertae sedis*) with *B. fragicola* as type, but he does not formally do so. J. B. Goodey

321—SHARIEF, A., 1957. [University College of Science, Osmania University, Hyderabad, A.P., India.] "On a new species of trichostrongylid nematode from Hyderabad, India." *Annals and Magazine of Natural History*, Series XII, 10, (118), 705-709.

Sharief describes a new species of nematode, *Herpetostrongylus leiperi* n.sp., from the intestine of *Varanus indicus* at Hyderabad, A.P., India. It is characterized by the shape of the female tail—with two terminal subventral processes—and the male bursa in which the dorsal lobe extends beyond the lateral lobes and the rays of the ventral and lateral systems arise separately.

W. G. Inglis

322—SIDDIQI, M. R., 1959. "Studies on *Xiphinema* spp. (Nematoda: Dorylaimoidea) from Aligarh (North India), with comments on the genus *Longidorus* Microtzy, 1922." *Proceedings of the Helminthological Society of Washington*, 26 (2), 151-163.

The female of *Xiphinema brevicaudatum* Schuurmans Stekhoven, 1951, previously only known from a larva, is described and figured. It is characterized by a knob-like offset head and an anteriorly placed guiding ring round the spear, the base of the spear extension having slight flanges. *X. indicum* n.sp. (female), *X. basiri* (male and female), and *X. citri* n.sp. (female) are described and figured. *X. indicum* has an anteriorly placed vulva and differs from *X. insigne* by its longer spear and fewer caudal pores. *X. basiri* differs from *X. index* by its longer spear, the slightly offset lip region and the more posterior vulva and from *X. diversicaudatum* by its shorter spear, the more posterior vulva, the greater body width and the shorter body. *X. citri* has an anterior guiding ring and slight basal flanges to the spear extension, and resembles *X. cylindricaudatum* Schuurmans Stekhoven & Teunissen, 1938 but has a more anteriorly placed vulva and other differences. A neotype of *X. americanum* Cobb, 1913 is described and figured. Siddiqi discusses the position of *X. brevicaudatum* and *X. citri* with regard to *Longidorus* and suggests the possibility of a new genus intermediate to *Xiphinema* and *Longidorus*.

J. B. Goodey

323—WELCH, H. E., 1958. "Agamomermis pachysoma (Linstow, 1905) n.comb. (Mermithidae: Nematoda), a parasite of social wasps." *Insectes Sociaux*, 5 (4), 353-355. [French & German summaries pp. 354-355.]

By examining fresh material and comparing it with type material in Britain and Berlin, Welch found the head of *Agamomermis pachysoma* (Linstow, 1905) n.comb. to have 16 papillae in six groups and small vase-shaped amphids. *Gordius vespae vulgaris* Baird, 1853 is inadmissible because a polynomial and *Mermis pachysoma* Linstow, 1905 becomes a synonym. *Agamomermis* is a collective genus for immature forms. J. B. Goodey

324—YEH, L. S., 1959. [London School of Hygiene & Tropical Medicine, Keppel St., London, W.C.1.] "A revision of the nematode genus *Setaria* Viborg, 1795, its host-parasite relationship, speciation and evolution." *Journal of Helminthology*, 33 (1), 1-98.

Yeh has revised the genus *Setaria* and has divided it into three genera: (i) *Hyraconema* n.g., type species *H. loveridgei* (Sandground, 1928), at present monospecific; (ii) *Setaria* Viborg, 1795 which is restricted to include the type species, *S. equina*, only; while all the other species recognized are referred to (iii) *Artionema* n.g. (type species, *A. africana* n.sp. from *Tragelaphus angasi*—type host—and *T. sylvaticus* and cattle). *Artionema* contains 19 species all of which occur in artiodactyles, thus: *A. javensis* (Vevers, 1923), *A. congolensis* (Railliet & Henry, 1911), *A. bernardi* (Railliet & Henry, 1911), *A. altaica* (Raevskaya, 1928), *A. hartwichi* n.sp. (type host, *Capreolus capreolus* from Germany), *A. tundra* (Isaichikov & Raevskaya, 1928), *A. scalprum* (Linstow, 1908), *A. caelum* (Linstow, 1904), *A. dipetalonematooides* (Chabaud & Rousselot, 1956), *A. southwelli* (Thwaite, 1927), *A. horngyi* (Boulenger, 1921), *A. bicoronata* (Linstow, 1901), *A. boulengeri* (Thwaite, 1927), *A. pillersi* (Thwaite, 1927), *A. poultoni* (Thwaite, 1927), *A. yorkei* (Thwaite, 1927), *A. africana* n.sp., *A. digitata* (Linstow, 1906), *A. labiato-papillosa* (Perroncito, 1882). All represent new combinations except the two new species. Yeh recognizes five genera within the sub-family Setariinae: *Setaria*, *Hyraconema*, *Artionema*, *Skrjabinofilaria* Travassos, 1925 and *Papillosetaria* Vevers, 1923. W. G. Inglis

Nematomorpha

No relevant abstracts in this issue

Hirudinea

325—CABALLERO Y C., E., 1957. [Instituto de Biología, Laboratorio de Helmintología, Universidad Nacional Autónoma de México.] "Hirudineos de México. XXI. Descripción de una nueva especie de sanguisugela, procedente de las selvas del Estado de Chiapas." *Anales del Instituto de Biología. Mexico*, 28 (1/2), 241-245.

A leech, *Pintobdella chiapasensis* n.sp., is described and figured from the State of Chiapas in Mexico. R. T. Leiper

Pentastomida

No relevant abstracts in this issue

Miscellaneous

See No. 357.

INVERTEBRATE INTERMEDIATE HOSTS

Arthropoda

See also Nos.: 59, 66, 67, 72, 73, 93, 94, 117, 119, 127, 202, 348, 412.

326—DUKE, B. O. L., 1959. [Helminthiasis Research Unit of the West African Council for Medical Research, Kumba.] "Studies on the biting habits of *Chrysops*. VI. A comparison of the biting habits, monthly biting densities and infection rates of *C. silacea* and *C. dimidiata* (Bombe form) in the rain-forest at Kumba, Southern Cameroons, U.U.K.A." *Annals of Tropical Medicine and Parasitology*, **53** (2), 203–214.
 In addition to descriptions of the biting behaviour of *Chrysops silacea* and *C. dimidiata* (Bombe form)—a fly of uncertain taxonomic status—Duke reports that the proportion of *C. silacea* infected with the larvae of *Loa loa* is higher in afternoon catches than in morning catches and he concludes that whereas nulliparous flies feed in the morning, parous flies feed mainly in the afternoon. He also shows, from dissections of *Chrysops* (of both species) caught over a period of 27 months, that the risk of man becoming infected with *L. loa* is greatest during the months of April, May and June. P. Williams

327—FERRAZ, D. M., MELLO, A. L. & RACHOU, R. G., 1958. [Departamento Nacional de Endemias Rurais, Brazil.] "Comprovação da transmissão da filariose bancroftiana em Pôrto Alegre (Rio Grande do Sul)." *Revista Brasileira de Malariologia e Doenças Tropicais*, **10** (3), 275–276. [English summary p. 276.]
 Carrying on their work on the transmission of bancroftian filariasis in Pôrto Alegre (Rio Grande do Sul) [see abstract No. 94] between December 1957 and March 1958, Ferraz *et al.* captured 5,635 mosquitoes all but two of which were proved to be *Culex pipiens fatigans*. Of 3,560 females, 2,342 were dissected and one pre-sausage form and one infective larva were found. W. K. Dunscombe

328—GALLIARD, H., 1959. [Institute de Parasitologie, Université de Paris.] "Biologie des culicidés du genre *Mansonioides* en Asie Orientale: leur importance comme vecteurs de parasites." *International Congress of Zoology* (15th), London, July 16–23, 1958. Proceedings, pp. 694–696. [Discussion pp. 696–697.]
 Galliard discusses Culicidae of the genus *Mansonioides* as intermediate hosts and vectors of filariasis. He mentions *M. longipalpis*, *M. indiana*, *M. uniformis*, *M. annulatus* and *M. annulifera* as very receptive intermediate hosts of *Wuchereria malayi*. *Culex fatigans* is the most important and, in many areas, almost the sole vector of *W. bancrofti*, *Mansonioides* being completely refractory. In the region of Travancore, there is a striking interdependence between the incidence of the vector mosquitoes, the incidence of microfilariasis and the number of clinical cases. In the discussion the author says that it does not seem that there is any correlation between the parts of the body exposed to mosquito bites and the external manifestations of filariasis. The intensity of clinical symptoms is directly related to the duration of exposure and to the number of infections. N. Jones

329—LAVOPIERRE, M. M. J. & CREWE, W., 1959. [Department of Entomology & Parasitology, Liverpool School of Tropical Medicine.] "The pseudotracheal pattern of *Chrysops* spp." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **53** (4), 307. Lavoipierre & Crewe exhibited specimens of the labella of *Chrysops silacea*, *C. dimidiata*, *C. centurionis* and *C. longicornis* to show that it is possible to distinguish the pseudotracheal pattern of one species from another. J. M. Watson

330—LEWIS, D. J., 1959. "Members of the *Simulium neavei* complex from Amani in Tanganyika." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **53** (4), 307.
 Lewis exhibited specimens and drawings of *Simulium neavei*, two species of fresh-water crab (one of which does not carry *Simulium*), and photographs of breeding places. A banded and an unbanded species of the *S. neavei* complex occur at Amani but their systematic position is as yet undecided. J. M. Watson

331—RACHOU, R. G., FERREIRA, M. O., MARTINS, C. M. & FERREIRA NETO, J. A., 1958. [Departamento Nacional de Endemias Rurais, Rio de Janeiro, Brazil.] "Variação mensal da densidade domiciliária do *Culex pipiens fatigans* em Florianópolis (Santa Catarina)." *Revista Brasileira de Malariologia e Doenças Tropicais*, **10** (1), 51–59. [English summary p. 59.] Rachou *et al.* record their observations on monthly variations in house densities of *Culex pipiens fatigans*, the principal vector of Brazilian (bancroftian) filariasis in Florianópolis, the

capital of Santa Catarina State. A four-year survey from 1953-56 of the same 40 houses each year showed that of over 1,800 mosquitoes captured 80% were females. Summer and the beginning of autumn are the periods of greatest density, but annual densities varied considerably.

W. K. Dunscombe

Mollusca

See also Nos.: 7, 12, 14, 19, 25, 27, 32, 113, 117, 129, 138, 144, 169, 179, 354, 384, 387, 396.

332—ENIGK, K., 1958. [Hannover, Deutsche Bundesrepublik.] "Die Vernichtung von Süßwasser- und Landschnecken." *Československá Parasitologie*, 5 (2), 59-65.

Enigk reports on the efficacy of sodium pentachlorophenate against snails *in vitro* and in the field. He recommends the drug at a concentration of 5% in water as a spray against *Lymnaea truncatula*, used on wet ground or in rainy weather. The results of the experiments are shown in a graph and indicate that the concentrations of the molluscicide per litre of water required to achieve 100% destruction in four days of different molluscs in the field were: *L. ovata* 1 mg., *L. stagnalis* 4 mg., *Planorbis cornutus* 14 mg., and *P. planorbis* 18 mg. Planorbids were irregularly destroyed with these concentrations. 50 mg. per litre of sodium pentachlorophenate were necessary to destroy *Vivipara vivipara* in four days. At a concentration of 1 gm. per cu.m. of water the chemical killed the fish. The rate of absorption of sodium pentachlorophenate by sand, mud, water-plants, wood and aluminium hydroxide is given and repeated spraying is recommended.

N. Jones

333—HASHIMOTO, I., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [The technique of a differential diagnosis of the male from the female of *Oncomelania nosophora*, and its ratio of both sexes in nature.] *Japanese Journal of Parasitology*, 8 (1), 76-80. [In Japanese: English summary p. 80.]

The reddish-brown tip of the large penis of male *Oncomelania nosophora* was found to be visible when the snail was crawling on a sheet of filter paper. The reliability of this criterion to distinguish males from females varied with age, being 92% in adults (over 5.1 mm. in shell length) and 60% in the young (3.1-4.0 mm.). The sex ratio of adult snails under natural conditions was 1:2, females being dominant.

M. Yoshida

334—HOSAKA, Y., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Study of standardized techniques for testing the susceptibility of *Oncomelania* snail to molluscicides.] *Japanese Journal of Parasitology*, 8 (1), 102-107. [In Japanese: English summary p. 107.]

The sensitivity of *Oncomelania nosophora* to sodium pentachlorophenate was studied by complete immersion in the test solution. The snails were further covered by a net made of polythene. The method was proved to be more reliable and sensitive than the plate method devised by McMullen.

M. Yoshida

335—IIJIMA, T., OOTA, S. & NAKAJIMA, S., 1959. [Yamanashi Prefectural Medical Research Institute, Kofu, Japan.] [Studies on molluscicides. 2. Molluscicidal effect of calcium arsenate on *Oncomelania nosophora*.] *Japanese Journal of Parasitology*, 8 (1), 57-61. [In Japanese: English summary p. 61.]

Calcium arsenate at 4-8 mg. per sq.m., either in powder form or suspension, was found to be effective in killing *Oncomelania nosophora*, provided the ditches were not watered for 10-14 days after the application.

M. Yoshida

336—KOMIYA, Y. & KOJIMA, K., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [The fate of *Oncomelania* buried in the soil.] *Japanese Journal of Parasitology*, 8 (1), 96-101. [In Japanese: English summary pp. 100-101.]

Oncomelania nosophora, buried in wet soil at various depths ranging from 1 cm. to 40 cm. from the surface, did not move significantly for a period of 51 weeks. 50% of the snails tested survived for 35 weeks at the position buried, the depth of which was immaterial to the longevity.

M. Yoshida

337—KOMIYA, Y. & IIJIMA, T., 1959. [Department of Parasitology, National Institute of Health, Tokyo.] [Local difference of the resistance of *Oncomelania nosophora*, the vector snail of *Schistosoma japonicum* in Japan, to dryness. 1.] **Japanese Journal of Parasitology**, 8 (2), 196-199. [In Japanese: English summary p. 199.]

The snails, *Oncomelania nosophora*, grown under dry conditions, were found to be more resistant to desiccation than those obtained from wet places. M. Yoshida

338—LOBATO PARAENSE, W. & DESLANDES, N., 1957. [Instituto Oswaldo Cruz, Brazil.] "Observations on an Afro-South American planorbid." **Anais do Instituto de Medicina Tropical. Lisbon**, 14 (3/4), 471-482. [French & Portuguese summaries p. 481.]

Four specimens of *Biomphalaria pfeifferi* were examined at the Oswaldo Cruz Institute. Their characteristics were found to correspond exactly with those of the South American *Taphius (Australorbis) centimetralis*. African and Brazilian *Taphius* when crossed produced fertile hybrids which established themselves. The proper name is therefore *Taphius pfeifferi* (Krauss, 1848). The snail was probably transported from Africa by human agency. W. K. Dunscombe

339—MAGALHÃES NETO, B., CALADO, O. B., BARBOSA, J. DE M., & ALMEIDA, G. R. DE, 1957. "O 'efeito de grupo' na ação moluscicida do pentaclorofenato de sódio e do sulfato cíprico." **Anais da Sociedade de Biologia de Pernambuco**, 15 (1), 73-82. [English summary pp. 81.]

Magalhães Neto *et al.* have investigated the effect of crowding of snails on the molluscicidal effect of sodium pentachlorophenate and copper sulphate. The snails used belonged to the Brazilian species *Tropicorbis centimetralis* and it was found that they were more easily killed when treated in groups of 100 than when they were treated individually, the volume of molluscicide solution per snail being the same in both cases. Experiments were also carried out in which two solutions of sodium pentachlorophenate were used, one freshly prepared and the other in which a group of snails had already been killed. No significant differences in the molluscicidal activity of these two solutions could be found.

C. A. Wright

340—MCCRAW, B. M., 1959. [Ontario Veterinary College, Guelph, Ontario, Canada.] "The ecology of the snail *Lymnaea humilis* Say." **Transactions of the American Microscopical Society**, 78 (1), 101-121.

McCraw describes a typical habitat of the snail *Lymnaea humilis*, intermediate host of *Fascioloides magna*. The zonation of the snails on the mud flats and river banks was noted and the concentration of young snails was found to be greatest near to the water's edge. There does not appear to be any diurnal rhythm in the distribution of the snails or evidence to indicate that temperature affects their movements to or from water. Although very susceptible to desiccation under experimental conditions and apparently dependent upon moist local conditions for survival of drought periods, *L. humilis* does not seek out humid micro-habitats. The snails are always more common on land than in water, and rises in water level result in a landward movement but individuals kept at 4°C.-5°C. survived for about six months under water. No evidence to show that predators limit a population was found.

C. A. Wright

341—TARGETT, G. A., 1959. [M.R.C. Bilharzia Research Unit, Winches Farm, Hatfield Road, St. Albans, Herts.] "Absorption spectra of haemoglobins from intermediate and non-intermediate hosts of schistosomiasis." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 10.

Preliminary results of spectrophotometric analyses suggest that the haemoglobins of *Australorbis glaberratus*, *Planorbarius corneus*, *Bulinus (Physopsis) globosus* and *B. (B.) tropicus angolensis* are similar.

R. T. Leiper

342—WRIGHT, C. A., 1959. [British Museum (Natural History), London, S.W.7.] "The generic names of intermediate hosts of *Schistosoma mansoni*." [Correspondence.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (2), 215.

Wright announces that in view of the recognized fact that the molluscan intermediate hosts of *Schistosoma mansoni* in Africa are congeneric with those in South America, an application has been placed before the International Commission on Zoological Nomenclature by Drs. F. S. Barbosa, B. Hubendick, E. A. Malek and himself, asking for a decision which will stabilize

the names of this most important group. Until such a decision is given, the generic name *Biomphalaria* should be used for the African intermediate hosts of *S. mansoni*, and for the South American hosts either *Australorbis* or *Tropicorbis*.

J. M. Watson

343—YOSHIDA, Y., & MIYAMOTO, M., 1959. [Department of Medical Zoology, Kyoto Prefecture University of Medicine, Japan.] [Studies on a first intermediate host, *Assiminea parasitologica* Kuroda, 1958 ('*Paludinella devilis*', of Yokogawa and Koyama *et al.* non Gould), of *Paragonimus ohirai* Miyazaki, 1939.] **Japanese Journal of Parasitology**, 8 (1), 122-129. [In Japanese: English summary p. 129.]

From the results of experimental infection and observations in its natural habitat, *Assiminea parasitologica* was shown to be the first intermediate host of *Paragonimus ohirai*. M. Yoshida

GENERAL HELMINTHOLOGY

Technique

See also Nos.: 193, 237, 252, 253, 333, 334, 377, 384, 385.

344—DAVE, P. J. & GADGIL, R. K., 1959. [Schistosomiasis Inquiry, I.C.M.R., Pathology School, Grant Medical College, Bombay-8, India.] "Evaluation of merthiolate iodine formaldehyde concentration technique as compared to direct smears, brine floatation and zinc sulphate centrifugal floatation techniques." **Indian Journal of Medical Research**, 47 (4), 371-376.

Dave & Gadgil compared direct smear in saline and direct smear in iodine, brine floatation, zinc sulphate centrifugal floatation and merthiolate iodine formaldehyde concentration (M.I.F.C.) techniques for the detection of parasites in stool samples from 615 patients. Of 323 samples negative by direct smear, brine floatation showed 11 (3.4%), zinc sulphate centrifugal floatation showed 52 (16.9%) and M.I.F.C. showed 118 (36.5%) as positives. The last-mentioned technique was useful in a rural survey as it was an excellent preservative when no facilities for immediate examination were available. Good concentration, fixation and staining of ova and cysts were achieved without any morphological distortion. The helminth eggs (or larvae) in the samples were those of *Ascaris*, *Trichuris*, *Strongyloides*, hookworm and tape-worm.

J. E. D. Keeling

345—GUINN, E., 1959. "The use of the zinc sulphate centrifugation flotation technic as a routine diagnostic procedure." **American Journal of Clinical Pathology**, 31 (1), 87-88.

A modified zinc sulphate centrifugal flotation technique is described. It has proved satisfactory for detection of protozoan cysts and helminth eggs, such as *Schistosoma mansoni*, *Clonorchis sinensis*, *Trichostrongylus* spp. and *Trichuris trichiura*. When five specimens were examined the efficiency of the method for detection of *T. trichiura* eggs was 100%. J. E. D. Keeling

346—HEYNEMAN, D., & SINDELL, B. A., 1959. [Department of Zoology, University of California, Los Angeles, U.S.A.] "Autolysis as an aid to cysticercoid counting in experimental *Hymenolepis nana* infections." **Journal of Parasitology**, 45 (2), 225.

A modification of the technique originated by Hunninen [see *J. Parasit.*, 1935, 21 (2), 124-125] for counting cysticercoids of *Hymenolepis nana* in the snail intestine of mice is described. The removed intestine is placed unopened in a petri dish containing tap or distilled water and refrigerated for 48 hours. Bacterial and autolytic breakdown allowed to occur during this time is appropriately controlled and slowed by the duration of refrigeration, so that neither the villi nor the cysticercoids are affected. A single washing clears the villi from the partly digested debris and mucus lodging in the intervillar crypts. Location of newly emerged worms in the autolysed material is facilitated, while those adhering to the gut wall can be counted *in situ* since no scraping is necessary. Previously infected villi can be identified by the abandoned cysticercoid lining.

G. I. Pozniak

347—HURLY, M. G. D., 1959. [Medical Research Council Laboratories, Fajara, Gambia.] "A method of estimating hookworm loads." *Annals of Tropical Medicine and Parasitology*, 53 (2), 228-234.

Hury considers that hookworm loads are best expressed in terms of female worms only, the number of which can be obtained by multiplying the egg count by the weight of the daily stools and dividing the product by the daily egg output of a single female (estimated at 6,600 in the case of *Necator americanus*). Hookworms can be recovered from stools cleanly by hosing the faeces in a 60-mesh sieve and then floating the worms off by partially immersing the sieve in magnesium sulphate or zinc sulphate solution.

J. M. Watson

348—MUELLER, J. F., 1959. "The laboratory propagation of *Spirometra mansonioides* (Mueller, 1935) as an experimental tool. II. Culture and infection of the copepod host, and harvesting the procercoïd." *Transactions of the American Microscopical Society*, 78 (3), 245-255.

A method for continuous culture of the cyclopoid hosts of *Spirometra mansonioides* is described in detail. Plankton is collected in a towing net and the relatively pure cultures of cyclopoids are obtained by controlled stagnation of the samples or by smothering in carbon dioxide. This process eliminates less resistant extraneous organisms. Cultures are maintained in nine-and-a-half gallon aquarium tanks under constant fluorescent illumination at a temperature of 23°C. The tanks are aerated through "blowers" and the cultures are fed on screened hay infusions which have been standing for at least 14 days. Late nauplii, copepodid larvae and adults are harvested by removing the water through a screened siphon. The water, which contains early nauplii, can be retained for the foundation of new cultures. Late nauplii and early copepodid larvae are most susceptible to infection with coracidia. Infection is brought about by concentrating large numbers of these organisms in a beaker with a massive hatch of coracidia. Infection normally takes place following random collisions. Procercoïds may be mature seven days after infection; and they can emerge from the intact copepods under the influence of heat. This faculty has been used in the axenic collection and concentration of procercoïds in a miniature Baermann apparatus. For details of the techniques employed this paper should be read in full.

J. E. D. Keeling

349—PITTS, T. D., 1959. [Department of Biology, Loyola University of Los Angeles, Los Angeles, California, U.S.A.] "A method for preparing whole mounts of microscopic helminths." *Journal of Parasitology*, 45 (3), 247-248.

A well, $1/16$ inch in diameter and $1/16$ inch deep was drilled in the centre of a solid watch glass. After perforation of a cellophane sheet with the tips of *minuten nadeln* [sic] a disc slightly over $1/16$ inch in diameter was punched out to act as a cap for the well. Newly hatched larvae of *Ascaris lumbricoides suum* could be transferred by pipette from fixing fluid and manoeuvred into the well under the dissecting microscope. The cap was placed under the surface of the liquid in the watch glass and slid into place and pushed down into the cavity so that the edge was turned upwards. Caustic potash, Delafield's haematoxylin, alcohols and cedarwood oil did not damage the cellophane cap. 10-20 minutes was allowed in each reagent. Most of the clearing agent was removed from the watch glass and the cap was removed. The larvae were transferred in a micropipette to a slide for mounting. Care was taken to collect any specimens left adhering to the cap or walls of the well.

J. E. D. Keeling

350—POUPLARD, L., GRÉGOIRE, G. & COTTELEER, C., 1959. "Le diagnostic de la bronchite vermineuse par l'examen de matières fécales." *Annales de Médecine Vétérinaire*, 103 (1), 3-6. The authors describe their method for the collection of *Dityocaulus filaria* larvae from faeces. The larvae are separated by spreading 10 gm. of faecal material on to a filter paper and inverting this over a 100 mesh per inch sieve which is placed in a funnel filled with water. At the lower end of the funnel is attached a piece of rubber tubing closed by a clip. After leaving for 24 hours about 2 c.c. of liquid at the bottom of the funnel are removed and the number of larvae counted by placing 1 c.c. of the suspension on a 2.5 cm. square marked in 0.5 cm. divisions. Larvae in the infective stage are obtained by washing the sedimented larvae and then aerating them at room temperature in fresh water for four days. Larvae in the infective stage may be stored at 2°C. for several days.

K. Heath

351—SHIRASAKA, R., 1959. [Department of Parasitology, Institute for Infectious Disease, University of Tokyo.] [Studies on the bionomics of infective larvae of parasitic nematodes. 2. Researches for the optimum conditions in the test tube cultivation of hookworm and *Trichostrongylus* larvae.] *Japanese Journal of Parasitology*, 8 (1), 62–68. [In Japanese: English summary pp. 67–68.]

Trichostrongylus, *Strongyloides*, *Necator* and *Ancylostoma* from faeces were successfully cultured *in vitro* at 25°C., by smearing 0.5 gm. of the sample over an area of 8 cm. long on a strip of filter paper, 16 cm. long and 2 cm. wide, which was confined in a test-tube containing 3–4 c.c. of water. M. Yoshida

352—SHIRASAKA, R., 1959. [Department of Parasitology, Institute for Infectious Disease, University of Tokyo.] [Studies on the bionomics of infective larvae of parasitic nematodes. 3. The relationship between the storage conditions of faecal samples and the larval development in test tube cultivation.] *Japanese Journal of Parasitology*, 8 (1), 69–75. [In Japanese: English summary pp. 74–75.]

To detect three species of nematodes—*Ancylostoma*, *Necator* and *Trichostrongylus*—in samples of faeces which have to be stored for up to 16 days, the samples should be kept under high humidity (a metal can suits this purpose) at 18°C. The temperature sensitivity varies with species, *Necator* being the most sensitive and *Ancylostoma* the least. M. Yoshida

353—VOGELSANG, E. G., 1957. "Diagnóstico microscópico de la distomatosis bovina." *Revista de Medicina Veterinaria y Parasitología*, Maracay, 16 (1/4), 33–38.

Vogelsang mentions or briefly describes some of the known methods of concentrating eggs of *Fasciola hepatica* from cattle faeces. M. McKenzie

354—WRIGHT, C. A. & ROSS, G. C., 1959. [British Museum (Natural History), London, S.W.7.] "Electrophoresis of snail blood." [Demonstration.] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 53 (4), 308.

Wright & Ross exhibited strips showing the results of paper electrophoresis of the blood proteins of *Australorbis glabratus*, obtained by a modified Kohn's cellulose-acetate membrane technique. Satisfactory separations were only obtained when the blood of snails in the 7–10 mm. groups was examined. The principal component was always haemoglobin which showed a mobility similar to the albumin fraction in human serum. J. M. Watson

Geographical Distribution

See also Nos.: 86, 87, 104, 115, 117, 119, 120, 122, 123, 124, 125, 127, 128, 129, 130, 134, 135, 136, 185, 190, 196, 197, 198, 212, 213, 217, 220, 221, 226, 232, 233, 234, 235, 236, 237, 254, 274, 275, 422, 425; Medical Helminthology—Surveys; Taxonomy—all sections.

355—BABERO, B. B., & SHEPPERSON, J. R., 1959. [Dept. of Zoology, Fort Valley State College, Georgia, U.S.A.] "On the occurrence of gnathostomes in Georgia, U.S.A." *Proceedings of the Helminthological Society of Washington*, 26 (1), 53–54.

Babero & Shepperson report the finding of 14 male and female specimens of *Gnathostoma spinigerum* Owen, 1836 (*sensu* Baylis, 1939 and Baylis & Lane, 1920) from tumours in the stomach of a raccoon in Georgia, U.S.A., and describe the pathological changes induced. Gnathostome cysts were also found in the peritoneum of a cottonmouth water moccasin (*Agkistrodon piscivorus*) also from Georgia. Some of the larvae from the cysts were fed to a cat and to three white rats with negative results. The significance of this is discussed and it is also pointed out that the discovery of encysted gnathostome larvae in a moccasin serves to show that snakes may act as intermediate hosts for that genus. W. G. Inglis

356—BARUŠ, V. & TENORA, F., 1957. [Katedra zoologie Vysoké školy zemědělské, Brno.] "Příspěvek k helminfoauně plchovitých (Myoxidae) jižního Slovenska." *Ceskoslovenská Parasitologie*, 4, 53–56. [German & Russian summaries pp. 55–56.]

In 1955 Baruš & Tenora examined 27 specimens of *Eliomys quercinus* and 14 of *Glis glis*. 89% of *E. quercinus* and 57% of *G. glis* carried helminth infections. The species recovered from the former host were: *Brachylaemus recurvus*, *Hymenolepis* spp., *Rictularia proni amurensis* and *Skrjabinocapillaria myoxi-nitelae*. From *G. glis* were recovered: *B. recurvus*, *Hymenolepis*

spp., *Longistriata* (L.) *schulzi* and *Moniliformis moniliformis*. Except for the last-named species all are new records for Czechoslovakia, and *B. recurvus* is recorded for the first time from the above hosts.

N. Jones

357—DELYAMURE, S. L., 1959. [Pedagogic Institute of the Crimea, Simferopol, U.S.S.R.] "Helminthofauna of the marine mammals of the world ocean and the regularities of its geographical distribution." *International Congress of Zoology* (15th), London, July 16-23, 1958. Proceedings, pp. 657-660. [Discussion p. 660.]

Delyamure reviews the major findings resulting from the study of helminth parasites of Pinnipedia and Cetacea made by Soviet scientists in recent decades and analyses them in relation to the bionomics and phylogeny of the hosts. Among other conclusions it is mentioned that the helminth fauna of marine mammals is richer in polar than in temperate or tropical seas, in the Arctic than in the Antarctic Ocean, and in the North Pacific than in the North Atlantic; that the helminth fauna of Pinnipedia differs drastically in the northern and southern hemispheres, as does that of Mysticeti from Odontoceti, perhaps due to differences in feeding habits; that the helminth parasites of Pinnipedia belong mainly to families (e.g. Setariidae, Filarioiidae, Dictyocaulidae, Ancylostomatidae, Heterophyidae and Echinostomatidae) widely represented in terrestrial predaceous mammals and marine birds whereas the helminth parasites of Cetacea belong to families (e.g. Brauniidae and Crassicaudidae) all the species of which are represented only in Cetacea. The basic differences in the bionomics and phylogeny of Pinnipedia and Cetacea are reflected in their helminth faunae, analysis of which permitted the deduction that Delphinidae show close phylogenetic relationship with Mustelidae and Viverridae. Their helminth parasites exert a demonstrably adverse effect on these marine mammals.

J. M. Watson

358—ERHARDOVÁ, B., 1958. [Biologický ústav ČSAV, parazitologie, Praha.] "Parasitičtí červi hlodavců Československa." *Československá Parazitologie*, 5 (1), 27-103. [German & Russian summaries pp. 92-93.]

Erhardová examined 4,478 specimens of Leporidae, Sciuridae, Myoxidae, Jaculidae, Muridae, Octodontidae and Caviidae from various parts of Czechoslovakia and found nine trematode species, seven species of larval cestodes and 16 species of adult cestodes. Nematodes were represented by two species in the larval stage and 28 species in the adult stage. The results are set forth in seven tables. Many of the species found are redescribed and figured. In the ecological part of the paper the author deals with the factors responsible for the specific composition of the helminth fauna in hosts. These factors are: (i) the host itself or its age, (ii) the biotope in which the host lives, (iii) places of contact between different host species and (iv) the food of the host.

N. Jones

359—GORDON, H. McL. & SOMMERVILLE, R. I., 1958. [McMaster Animal Health Laboratory, C.S.I.R.O., Parramatta Road, Glebe, N.S.W., Australia.] "New records of nematode parasites in Australia." [Correspondence.] *Australian Journal of Science*, 21 (5), 148-149. Gordon & Sommerville report on the finding of *Trichostrongylus vitrinus*, *Cooperia curticei*, *Strongyloides* sp. and a single *Nematodirus* sp. from *Trichosurus vulpecula*, caught in the Sydney metropolitan area. This is the first record of these helminths from phalangers. *N. abnormalis* from sheep, *N. helveticus* from cattle and *Mastophorus muris muris* from a cat and a mouse are reported for the first time from Australia.

N. Jones

360—KOPŘIVA, J., 1957. [Katedra zoologie Vysoké školy zemědělské, Brno.] "Motolice žab v Československu." *Československá Parazitologie*, 4, 191-199. [Russian summary pp. 198-199.] Kopřiva, working in Czechoslovakia, examined 195 specimens of *Rana temporaria*, *R. esculenta esculenta*, *R. lessonae*, *R. dalmatina*, *Bufo viridis*, *B. bufo*, *Bombina bombina* and *Hyla arborea*. The total incidence of infection with different parasites was 78.4%, out of which 43% were infected with nematodes and 48.7% with trematodes. The latter are described and illustrated. They were: *Haplometra cylindracea*, *Haematoloechus variegatus*, *Gorgodera cygnoides*, *Prosotocus confusus*, *Pleurogenes claviger*, *Polystoma integerrimum*, *Diplodiscus subclavatus*, *Pleurogenoides medians*, *Pleurogenes loossi* and *Opisthioglyphe ranae*.

N. Jones

361—PROKOPIČ, J., 1957. [Biologický ústav ČSAV, parazitologie, Praha.] "K helmintofauně našich žab." **Československá Parazitologie**, 4, 249–262. [Russian summary p. 261.] Prokopič presents the results of a survey of the helminth parasites of anuran Amphibia in Czechoslovakia. He reports that 74% of 173 specimens of *Rana esculenta*, *Bombina variegata*, *R. temporaria*, *Bufo viridis*, *R. arvalis*, *R. ridibunda*, *Hyla arborea*, *Pelobates fuscus* and *Rana dalmatina* examined carried helminth infections. The parasite species were: *Dolichosacculus rastellus*, *Opisthiothioglyphe ranae*, *Haplometra cylindracea*, *Haematoloechus variegatus*, *Pleurogenes claviger*, *Prostotocus confusus*, *Gorgodera cygnoides*, *Diplodiscus subclavatus*, *Nematotaenia dispar*, *Cosmocerca ornata*, *Oswaldocruzia bialata*, *O. goezi*, *Rhabdias bufoonis*, *Cylindrotaenia americana*, *Physaloptera amphibia*, *Cosmocerca commutata*, *Oswaldocruzia subauricularis*, *O. lenteixerai* and *O. ukrainae*. The last six species are reported for the first time in Czechoslovakia.

N. Jones

362—PROKOPIČ, J., 1958. [Biologický ústav ČSAV, parazitologie, Praha.] "Studium helmintofauny šelem v Čechách a na Moravě." **Československá Parazitologie**, 5 (1), 157–164. [English & Russian summaries p. 163.] Prokopič examined post mortem 93 specimens of: *Canis familiaris*, *Vulpes vulpes*, *Putorius putorius*, *Felis catus domesticus*, *Meles meles*, *Mustela erminea*, *Martes marten*, *Chaus chaus* and *Mustela nivalis* from various parts of Czechoslovakia. The total incidence of infection with trematodes, cestodes and nematodes was 76.33%. The incidence of infection of separate host species was nil to 100%. The helminths found were: *Euryhelmis squamula*, *Euparyphium melis*, *Taenia pisiformis*, *T. hydatigena*, *T. crassiceps*, *T. multiceps*, *T. tenuicollis*, *T. laticollis*, *Hydatigera taeniaeformis*, *Atriotaenia incisa*, *Mathevotaenia ichneumontis*, *Mesocestoides lineatus*, *Diphyllobothrium erinacei*, *Dipylidium caninum*, *Physaloptera torquata*, *Spirocera lupi*, *Toxocara canis*, *T. mystax*, *Toxascaris leonina*, *Uncinaria stenocephala*, *Crenosoma vulpis*, *Aelurostrongylus falciformis*, *Capillaria putorii* and *C. mustelorum*.

N. Jones

363—RAUSCH, R. & WILLIAMSON, F. S. L., 1959. [Zoonotic Disease Section, Arctic Health Research Center, Public Health Service, U.S. Department of Health, Education and Welfare, Anchorage, Alaska.] "Studies on the helminth fauna of Alaska. XXXIV. The parasites of wolves, *Canis lupus* L." **Journal of Parasitology**, 45 (4), 395–403. During a ten-year survey, 200 wolves were killed, principally in the Brooks Range region of arctic Alaska, and the following helminths were found: *Taenia hydatigena*, *T. krabbei*, *T. multiceps*, *Echinococcus granulosus*, *Alaria canis*, *Toxascaris leonina*, *Uncinaria stenocephala* and *Trichinella spiralis*. Short notes are given on the rates of infection, distribution and life-histories of these helminths. Although *E. granulosus* and *T. spiralis* are species pathogenic to man, wolves as reservoirs of human infections are thought to be unimportant when the close association between hunters and traders and their dogs is taken into consideration. G. I. Pozniak

364—SINGH, S. N., 1959. [Department of Parasitology, London School of Hygiene and Tropical Medicine, London.] "Adult specimen of *Euparadistomum buckleyi* Singh, 1958 from an Indian fox." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (1), 9. *Euparadistomum buckleyi* Singh, 1958 was recovered on two occasions from the Indian fox *Vulpes alopec*. The six other species of the genus are listed.

R. T. Leiper

365—TENORA, F., 1957. [Katedra zoologie Vysoké školy zemědělské, Brno.] "Příspěvek k helmintofauně drobných zemních ssavců našich hor." **Československá Parazitologie**, 4, 351–354. [German & Russian summaries, p. 353.] Tenora, working in Czechoslovakia, examined 156 specimens of murines and insectivores comprising *Mus musculus*, *Clethrionomys glareolus*, *Pitymys subterraneus*, *Microtus arvalis*, *Apodemus flavicollis*, *A. sylvaticus*, *M. agrestis*, *Sorex araneus*, *S. alpinus* and *Talpa europaea*. In the Muridae examined were found: two species of trematodes, five species of larval and eight species of adult cestodes, seven species of adult nematodes and larvae of *Agamospirura* sp. Insectivora harboured two cestode and one nematode species. *Notocotylus nyeri* and *Plagiorchis muris* were found in a new host, *Microtus agrestis*. *Pitymys subterraneus* is also reported as a new host of *Paranoplocephala brevis*.

N. Jones

366—VOGELSANG, E. G. & MAYAUDON, T., H., 1957. "Contribución al estudio de la parasitología animal en Venezuela. XXII." *Revista de Medicina Veterinaria y Parasitología*. Maracay, 16 (1/4), 67-69.

Vogelsang & Mayaudon list as new records from Venezuela eight species of cestodes: *Oochoristica amphibiaenae*, *O. agamae*, *O. megastoma*, *O. surinamensis*, *O. tetragonocephala*, *Schizotauenia decrescens*, *Inermicapsifer (Railhetina) demerariensis* and *Taenia taeniaeformis*; and five species of nematodes: *Toxocara mystax*, *Physaloptera cebi*, *Dipetalonema graciele* (Rudolphi, 1809) [?gracilis], *Ancylostoma cuneopati* and *Protozoophaga obesa* with the vertebrate hosts in which they were found.

M. McKenzie

367—WILLIAMS, R. W., 1959. [School of Public Health and Administrative Medicine, Columbia University, U.S.A.] "Some nematode parasites of tree frogs, toads, lizards, and land crabs of the Bermuda Islands." *Journal of Parasitology*, 45 (2), 239.

The following nematodes are reported from Bermuda for the first time: *Cosmocerca* sp., *Aplectana* sp. or *Thelandros* sp. from *Eleutherodactylis johnstonei*; *Pharyngodon armatus* from *E. luteolus*; *Rhabdias sphaerocephala* and *Aplectana vellardi* from *Bufo marinus*; *Atractis carolinea* from *Anolis leachii* (new host record); *Triphyllium carcinicolum* and larval *Monhystera* from *Gecarcinus lateralis*.

J. M. Watson

Cytology and Genetics

See No. 68.

368—HOVASSE, R., 1959. "Étude au microscope électronique des phénomènes cytoplasmiques de la spermatogénèse chez l'Ascaris (*Parascaris equorum*)."
International Congress of Zoology (15th) London, July 16-23, 1958. Proceedings, pp. 708-709. [Discussion p. 709.]

Hovasse discusses spermatogenesis in *Parascaris equorum* as revealed by electron microscopy. He also describes the relative positions of the spermatocyte nucleus, the ascaridine granules and the chondriosomes. Mitochondria do not seem to play any role in spermatogenesis. Their structure is very dense and abnormal. The Golgi bodies consist of a large number of saccular dictyosomes, which are associated with the ascaridine granules.

N. Jones

Morphology, Anatomy and Histology

See also Nos.: 81, 171, 256, 271, 272, 309, 322, 323, 424; Taxonomy—all sections.

36—SCHILLER, E. L., 1959. [Department of Pathobiology, School of Hygiene and Public Health, The Johns Hopkins University, Baltimore, Md, U.S.A.] "Experimental studies on morphological variation in the cestode genus *Hymenolepis*. II. Growth, development and reproduction of the strobilate phase of *H. nana* in different mammalian host species." *Experimental Parasitology*. New York, 8 (3), 215-235.

Having examined normal larval development [for abstract see Helm. Abs., 28, No. 36j], Schiller reports his findings on growth rate, egg production and longevity of the adult form of the cestode *Hymenolepis nana* (von Siebold, 1852) in three different host species (albino mice, albino hamsters, grey squirrels) experimentally infected with an optimum dosage of five cysticercoids and maintained under standard conditions. A comparative morphological study—using standard technique throughout—showed that in mice the worms reached maximum development in ten days, progressive senescence after 14 days and death at 20-24 days. In hamsters growth is slower but maximum size is the same, senescence is slower but longevity the same. In squirrels, however, the growth rate is faster, maximum size greater and ageing more rapid, although the life span is the same. It was shown that the diet of the squirrel was not responsible for the larger size of the worms. *In vitro* experiments showed that eggs are discharged in "bursts" at the junctions of gravid segments. Egg production, based on the mean volume of gravid segments, is influenced by the host but there is no significant difference in egg size. The carbohydrate content of the host's diet affects early growth and maturation of the worm, and thus its size and egg production, but caused no significant alteration in other morphological characteristics. There are five figures, eight tables and ten references.

J. Mahon

370—CAVENESS, F. E. & BOSHER, J. E., 1959. [Plant Pathology Department, South Dakota State College, Brookings, South Dakota, U.S.A.] "On the misuse of the term 'incisure'." **Proceedings of the Helminthological Society of Washington**, 26 (2), 124.

Caveness & Bosher suggest the use of the word "involution" for the structures in nematodes hitherto known as "incisures". The latter word is inappropriate since it implies a cut or gash whereas these structures are longitudinal cuticular folds which open and may even disappear temporarily with cuticular distension following on increase of body volume. J. M. Watson

371—HULL, R. W. & CAMIN, J. H., 1959. [Department of Biological Sciences, Northwestern University, Evanston, Illinois, U.S.A.] "Macdonaldius setae Khanna, 1933 in captive snakes." **Transactions of the American Microscopical Society**, 78 (3), 323-329.

Of 617 snakes from all parts of the world examined at zoological gardens in North America, only one *Elaphe obsoleta lindheimeri* and two *Pituophis catenifer sayi* (both caught in North America) were infected with the nematode *Macdonaldius setae*. Both the adults and microfilariae are described and these descriptions and measurements are compared with and augment the original diagnosis given by Khanna in 1933. The present authors were able to observe the presence of an excretory pore in some of the adults and of a thin close-fitting sheath in the microfilariae, and that the worms are ooviparous. G. I. Pozniak

372—LUCKER, J. T. & HONESS, R. F., 1959. [Animal Disease and Parasite Research Division, U.S. Dept. of Agriculture, Beltsville, Maryland, U.S.A.] "The infective larva of *Nematodirella longispiculata antilocaprae* (Nematoda: Trichostrongylidae)." **Proceedings of the Helminthological Society of Washington**, 26 (1), 43-47.

Lucker & Honess describe the infective larva of *Nematodirella longispiculata antilocaprae*, a trichostrongylid nematode common in the prong-horned antelope (*Antilocapra americana*). They show that the characters which serve to differentiate the larva of *N. l. antilocaprae* from the larvae of the other genera of gastro-intestinal nematodes occurring in domestic ruminants are the same as those which differentiate the larvae of *Nematodirus* species. After a detailed consideration of the differences between the infective larvae of *Nematodirella* and *Nematodirus* the authors conclude that no reliable means exist for the separation of the larva of *Nematodirella l. antilocaprae* from the larvae of some *Nematodirus* species. W. G. Inglis

373—RYŠAVÝ, B., 1958. [Biologický ústav ČSAV, parazitologie, Praha.] "Doplněk k poznání hlístic (Nematoda) dovezených želv řeckých (*Testudo graeca* L.)." **Československá Parazitologie**, 5 (1), 179-183.

Ryšavý describes and illustrates *Tachygometria dentata*, *T. longicollis*, *T. stylosa* and *T. uncinata* recovered from 12 specimens of *Testudo graeca*. N. Jones

374—YOKOGAWA, M., YOSHIMURA, H., & SUZUKI, J., 1959. [Department of Parasitology, School of Medicine, Chiba University, Japan.] [*Gnathostoma doloresi* Tubangui, 1925, its distribution in South Izu province, Shizuoka Prefecture, Japan, and the results of the morphological findings.] **Japanese Journal of Parasitology**, 8 (1), 22-28. [In Japanese: English summary pp. 27-28.]

Gnathostoma doloresi was identified from the stomach wall of wild boars. Some differences from Sandosham's descriptions were observed so that the number of rows of hooks in the region of the head-bulb varied from eight to thirteen and the membranous expansion in the proximal half of the left spicule was not confirmed. M. Yoshida

Physiology

See also Nos.: 52, 91, 211, 258, 266.

375—DIMITROVA, E. & KARATOTEVA, T., 1958. [Tsentr. gelm. laboratoriya BAN i kafedra med. fiziki pri VMI, Sofiya.] [The effect of ultra-sound on *Trichinella* in the muscles.] **Československá Parazitologie**, 5 (2), 47-49. [In Russian.]

Dimitrova & Karatoteva exposed suspensions of trichinellae to the action of ultra-sonic waves for periods ranging from two seconds to 30 minutes. After exposure of two seconds to an intensity of 0.35 vt. per sq. cm. cuticular permeability to dyes was obtained. As a result of this the worms were coloured in patches from sky-blue to dark violet with toluidene. The

control trichinellae did not absorb any dye at all. After exposure of from 5 to 15 seconds with the intensity unchanged, one part of the body was coloured more intensely, while the other lost all permeability to the dye. No correlation was noticed between the character of the internal organs and permeability to dyes. After two seconds exposure to an intensity of 0.8 vt. per sq. cm. the trichinellae unrolled and their internal organs were destroyed; the worms remained alive but lost their infectivity. Viability was lost and almost complete transparency of trichinellae was obtained with an exposure of 5 to 15 seconds at the above intensity and for 5 to 30 minutes to an intensity of 2.7 vt. per sq. cm. Experiments on sterilization of trichinous meat showed (i) about 10% to 20% of trichinellae recovered from meat which had been treated with ultra-sonic waves had their internal structure destroyed; (ii) the quantity of trichinellae in mice infected with worms so treated was about 40% of that from animals infected with control trichinellae. From the fact that exposure of trichinellae to ultra-sonic waves was always accompanied by cavitation, it is concluded that the changes resulting from the exposure are connected with cavitation.

N. Jones

376—FARHAN, I., SCHWABE, C. W. & ZOBEL, C. R., 1959. [Departments of Chemistry & Tropical Health, American University of Beirut, Beirut, Lebanon.] "Host-parasite relationships in echinococcosis. III. Relation of environmental oxygen tension to the metabolism of hydatid scolices." *American Journal of Tropical Medicine and Hygiene*, 8 (4), 473-478.

Using the polarographic method, the authors found that the dissolved oxygen content of hydatid fluid of bovine origin, ranged from 2.80-3.12 cu. mm. per ml. for lung cysts, and 1.28-2.28 cu. mm. per ml. for liver cysts. The Q_{O_2} of hydatid scoleces ranged from 0.39-1.50 at an oxygen tension representing hydatid cyst fluid saturated with air. Hydatid tissues are able to respire at 54% of their "optimum rate" in liver cysts and 96% in lung cysts at the *in vivo* oxygen tension of cyst fluid. This indicates that scoleces probably metabolize aerobically.

G. A. Webster

377—ICHII, S., MATSUMOTO, K. & SUGIURA, K., 1959. [Laboratory of Medical Zoology, Showa Medical School, Tokyo.] [Metabolic changes in *Ascaris lumbricoides* var. *suum* during the culture *in vitro*. 2. Digestive enzymes.] *Japanese Journal of Parasitology*, 8 (1), 19-21. [In Japanese: English summary p. 21.]

The activity of amylase, estearase and protease in the intestine of *Ascaris lumbricoides* maintained in physiological saline, stayed at the initial level for the first three days and then decreased very slowly, whereas the enzymes in haemolymph lost their activities from the very beginning of culture. The difficulty in culturing *Ascaris* *in vitro* was suggested to be due to the lability in the physiological conditions of haemolymph.

M. Yoshida

378—KUNII, Y., 1959. [Laboratory of Nematology, Kanto-Tosan Agricultural Experiment Station, Japan.] [Studies on the ovicidal effect of mustard oil. 3. Influence of mustard oil on the oxygen uptake of *Ascaris* eggs.] *Japanese Journal of Parasitology*, 8 (1), 1-5. [In Japanese: English summary p. 5.]

A significant decrease in oxygen consumption was observed in fertilized eggs of *Ascaris* when treated previously with mustard oil (allyl, phenyl, butyl, benzyl and tolyl) for a period of up to seven days at 28°C. Among those tested, tolyl oil was most effective. The inhibitory effect of the drugs increased with the period of treatment. The change in oxygen consumption of the treated eggs may thus be used as a measure of the ovicidal effectiveness of the drug.

M. Yoshida

379—MARSH, C. L. & KELLEY, Jr., G. W., 1959. [Department of Animal Pathology and Hygiene, University of Nebraska, Lincoln, Nebraska, U.S.A.] "Studies in helminth enzymology. II. Properties of an inorganic pyrophosphatase from *Ascaridia galli*, a nematode parasite of chickens." *Experimental Parasitology*, New York, 8 (3), 274-285.

Marsh & Kelley have examined the characteristics of a partly purified inorganic pyrophosphatase from the tissues of *Ascaridia galli*. The pH optimum in the presence of Mg^{++} was 6.8 to 7.2; the K_m was $6.4 \times 10^{-4}M$. A number of substances, including cadmium chloride and sodium fluoride, inhibited the enzyme at low concentrations.

W. P. Rogers

380—OYA, H., 1959. [Department of Pharmacology, School of Medicine, Juntendo University, Japan.] [The oxidative decarboxylation of *l*-malic acid and the oxidation of some other intermediates of tricarboxylic acid cycle by the muscle of *Ascaris lumbricoides* var. *suis*.] **Japanese Journal of Parasitology**, 8 (1), 29-43. [In Japanese: English summary p. 43.]

Malic acid, when incubated with muscle homogenate of *Ascaris*, formed pyruvic and lactic acids suggesting the existence of a lactic dehydrogenase system in the homogenate. The rate of oxygen consumption of the homogenate was increased on adding pyruvic, acetic, citric or α -ketoglutaric acid. Though this was suggested to be due to the presence of an enzyme system related to the tricarboxylic acid cycle, the low activity of the system led Oya to doubt the physiological importance of the cycle *in vivo*. M. Yoshida

381—ROBINSON, Jr., E. J., 1959. [Department of Biology, Kenyon College, Gambier, Ohio, U.S.A.] "Recovery of *Schistosoma mansoni* from hormonally imbalanced hosts." **Experimental Parasitology**, New York, 8 (3), 236-243.

Robinson repeated Berg's work [for abstracts see Helm. Abs. 22, No. 394a & 26, No. 151h] on the effects of hormonal treatment on the survival rate of the two sexes of *Schistosoma mansoni* in mice. He failed to confirm Berg's observation that injection of testosterone reduced the numbers of both sexes and that castration decreased the chances of survival of *S. mansoni* in the mouse. Combination of castration and testosterone, however, reduced the number of male worms surviving but had no effect on females. Robinson discusses the varied factors which could affect the survival of schistosomes in a host, and concludes that the possibility exists that the survival rate of schistosomes can be altered by hormonal imbalance, but that the conditions required for a predictable specific alteration are not known. D. L. H. Robinson

382—ROBINSON, Jr., E. J., 1959. [Department of Biology, Kenyon College, Gambier, Ohio, U.S.A.] "Further studies on the effect of abnormal host metabolism on *Schistosoma mansoni*." **Journal of Parasitology**, 45 (3), 295-299.

Robinson reports that: normal mice of two different strains—CFW (Carworth Farms) strain and RAP (Rockland Farms) strain were equally good hosts for *Schistosoma mansoni*, measured in terms of the percentage of worms surviving to maturity; that castration did not significantly reduce the survival rate of either sex of worm in either strain, although smaller numbers of both sexes were taken from RAP castrate hosts than from the controls; that castration of CFW hosts caused a significant increase in the survival rate of female worms; that treatment of the hosts with alloxan (to induce a high blood sugar level) caused a greater mortality of male than of female worms; and that concomitant castration and alloxan treatment caused a more significant reduction in survival of both sexes than alloxan alone. He concludes that the discrepancies in results of certain experiments are probably due in part to unknown variable factors in the environment of the worms, and in part to the small scale of the various experiments which are compared. [Certain statements in the text of this paper appear to be contradictory, while others are not consistent with the figures given in the table.] J. M. Watson

383—VOGE, M., 1959. [Department of Infectious Diseases, School of Medicine, University of California, Los Angeles, U.S.A.] "Sensitivity of developing *Hymenolepis diminuta* larvae to high temperature stress." **Journal of Parasitology**, 45 (2), 175-181.

Hymenolepis diminuta larvae growing at 30°C. in *Tribolium confusum* were exposed at various periods of their development to supra-optimal temperatures of 38.5°C. to 40°C. for six hours to four days. Exposure lasting 24 hours or longer showed that the sensitive period extended from the second to the sixth day of larval development. Maximum sensitivity occurred between the third and the fifth day and coincided with maximum larval growth and development. The highest incidence of inhibition of scolex-withdrawal followed exposure on the third to fourth days; and complete inhibition of infectivity of normally withdrawn larvae to white rats followed exposure on the fourth to fifth day. These two periods apparently overlapped but did not coincide. Fully developed cysticercoids remained unaffected. Larvae affected by temperature did not catch up in development even when a longer period (up to 16 days) was allowed. These results are compared with earlier findings on the effect of supra-normal temperatures on development in insects. G. I. Pozniak

384—WRIGHT, C. A. & CLAUGHER, D., 1959. [British Museum (Natural History), London, S.W.7.] "Paper chromatography in snail taxonomy." [Demonstration.] **Transactions of the Royal Society of Tropical Medicine and Hygiene**, 53 (4), 308.

Wright & Claugh exhibited chromatograms of the body-surface mucus of five species of *Lymnaea* (*L. palustris*, *L. peregra*, *L. auricularia*, *L. a. rufescens* and *L. natalensis*) and four species of *Bulinus* (*B. ugandae*, *B. globosus*, *B. truncatus* and *B. forskali*). They show that *L. palustris* is not closely related to the other species of *Lymnaea*, which belong to the same group and have a bright blue band at *Rf* 0.4 in common. *B. ugandae* and *B. globosus*, which are very similar in both conchological and morphological characters, are readily distinguished by their chromatogram patterns. The solvent mixtures used were butanol/acetic acid/water (100:22:50) for *Lymnaea* spp. and iso-propanol/1% aqueous ammonia (2:1) for *Bulinus* spp.

J. M. Watson

385—STIREWALT, M. A., 1959. [Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md, U.S.A.] "Isolation and characterization of deposits of secretion from the acetabular gland complex of cercariae of *Schistosoma mansoni*." **Experimental Parasitology**. New York, 8 (3), 199-214.

Stirewalt describes a method for obtaining secretion from the acetabular glands of cercariae of *Schistosoma mansoni*. Histochemical tests indicated that the secretion contained mucin.

W. P. Rogers

386—TAKIZAWA, K., 1957. [Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Pharmacological studies on the toxin of *Gnathostoma*.] **Igaku Kenkyu. Fukuoka**, 27 (11), 2747-2766. [In Japanese: English summary pp. 2765-2766.]

Extracts of the third-stage larva and the adult of *Gnathostoma spinigerum* and the culture medium of the worms were found to be effective in modifying the rhythmic contractions of frog heart and of intestine and stomach of rabbits, the effect being either inhibitory or acceleratory according to the concentration. From this finding together with the results of Schultz-Dale's test, it was considered that the toxic action observed was mainly due to the presence of a substance resembling acetylcholine pharmacologically.

M. Yoshida

Life-Cycle and Development

See also Nos.: 161, 190, 195, 206, 207, 208, 228, 244, 272, 292, 309, 343, 348, 355, 369, 383, 397, 398, 400, 412.

387—BARBOSA, F. S., COELHO, M. V. & COUTINHO-ABATH, E., 1958. [Centro de Pesquisas Aggeu Magalhães, Recife, Brazil.] "Infestação natural e experimental de alguns mamíferos de Pernambuco por *Schistosoma mansoni*." **Revista Brasileira de Malariologia e Doenças Tropicais**, 10 (2), 137-144. [English summary pp. 143.]

Barbosa *et al.* investigated the natural and experimental infection of some mammals in the area of Pernambuco with *Schistosoma mansoni*. Using cercariae from *Australorbis glabratus* they succeeded in infecting a marsupial (*Didelphis paraguayensis paraguayensis*), two edentates (*Euphractus sexcinctus* and *Tamandua tetradactyla*), four rodents (*Cavia aperea aperea*, *Cuniculus paca*, *Cercomys cunicularis laurentius* and *Dasyprocta aguti*), two carnivores (*Felis catus* and *Galictis furax*), two ungulates (*Capra hircus* and *Sus scrofa*) and a primate (*Callithrix* sp.). The ant-eater, *Tamandua tetradactyla*, and a wild rat, *Cercomys cunicularis laurentius*, which have not previously been listed as potential hosts of this trematode, were successfully infected. In addition opossums and a rodent (*Cavia aperea aperea*) were found naturally infected, the latter for the first time in north-east Brazil. The pig was a very poor host; the marmoset on the other hand was an excellent one which could be used for laboratory investigations on experimental *Schistosoma mansoni* infections.

W. K. Dunscombe

388—FREEMAN, R. S., 1959. [Department of Parasitology, Ontario Research Foundation, Toronto, Ontario, Canada.] "On the taxonomy of the genus *Cladotaenia*, the life histories of *C. globifera* (Batsch, 1786) and *C. circi* Yamaguti, 1935, and a note on distinguishing between the plerocercoids of the genera *Paruterina* and *Cladotaenia*." **Canadian Journal of Zoology**, 37 (3), 317-340. The life-histories of two dilepidid cestodes of hawks from southern Canada and U.S.A. are described. These are *Cladotaenia globifera* (from *Accipiter gentilis atricapillus*, *A. striatus*

velox, *Buteo p. platypterus*, *B. jamaicensis*, and *Circus cyaneus hudsonius*) and *Cladotaenia circi* (from *Circus cyaneus hudsonius* and *A. cooperi*). The life-cycles were traced experimentally by feeding eggs from naturally infected *A. striatus velox* and *C. cyaneus hudsonius* to laboratory-raised *Mus musculus* and *Peromyscus maniculatus gracilis*. Plerocercoid larvae of both species were recovered from the livers of these rodents. The eggs and development of the plerocercoids of the two species are described and illustrated by drawings and photomicrographs. In nature, plerocercoids of *Cladotaenia circi* were recovered from *P. m. sonoriensis* in Utah, but not from more than 2,350 small mammals examined from Algonquin Park, Ontario. Natural infections of plerocercoids of *C. globifera* were found in seven species of small mammals in Ontario, *Clethrionomys gapperi*, *Napaeozapus insignis*, *P. leucopus*, *P. maniculatus*, *Sorex cinereus*, *Tamias striatus* and *Tamiasciurus hudsonicus*. No mature strobilae were obtained from experimental feedings of plerocercoids of *C. globifera* to several wild young *A. striatus* and one young *A. gentilis atricapillus*. Since at least three species of plerocercoids similar in appearance occur naturally in the livers of small mammals in Ontario, *Cladotaenia globifera*, *Paruterina candelabria* and *P. rauschi*, it is useful to be able to distinguish them. Plerocercoids of *Cladotaenia* and *Paruterina* are differentiated most reliably by the ratio of length of hook to length of guard of the large rostellar hooks, being less than 3.5:1 for *Cladotaenia*, more than 3.5:1 for *Paruterina*. Descriptions of freshly obtained strobilae of *C. globifera* and *C. circi* are given, the taxonomy of species of *Cladotaenia* is reviewed, and a key given to the ten recognized species of *Cladotaenia* in the world.

E. I. Sillman

389—LUCKÝ, Z., 1957. [Parasitologická katedra veterinární fakulty Vysoké školy zemědělské, Brno.] “*Apophallus mühlingi* (Jägerskiöld, 1899) Lühe, 1909, metacerkariae cizopasíci u horávek a cejnku malých.” *Československá Parazitologie*, 4, 223–226. [German & Russian summaries p. 226.] Lucky reports on the finding of a metacercaria of *Apophallus mühlingi* in *Rhodeus sericeus* and *Blicca bjoernka*. N. Jones

390—UEKI, T., 1957. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [Experimental studies on the third stage larva of *Gnathostoma spinigerum*.] *Igaku Kenkyu. Fukuoka*, 27 (6), 1162–1196. [In Japanese: English summary pp. 1194–1196.]

It was concluded that the third-stage larvae of *Gnathostoma spinigerum* obtained from *Ophicephalus argus*, when given to mice or rats orally or cutaneously, had to pass through the liver and stay there for some time, whereas larvae transferred from rodents to rodents could find their way directly to muscle. Earlier onset and more frequent occurrence of encystment observed in the latter case were considered to be due to the shortened migratory pattern. Takata's reaction appeared when the liver was infected. It was revealed histochemically that the digestive systems of the worms infecting rodents maintained a considerable degree of activity. During their infecting period, the worms showed no morphological change except a slight increase in size.

M. Yoshida

391—WIŚNIEWSKI, W. L., SZYMANIK, K. & BAŻAŃSKA, K., 1958. [Section of Parasitology, University of Warsaw, Warsaw, Poland.] “The formation of a structure in tapeworm populations.” *Československá Parazitologie*, 5 (2), 195–212.

Wiśniewski *et al.* analysed the tapeworm populations of 37 specimens of *Fulica atra*, 45 specimens of *Podiceps cristatus*, 36 *Anas platyrhynchos* and 6 *Erolia alpina*. The results of the investigation showed that in the case of *Ligula intestinalis*, *Fimbrilaria fasciolaris*, *Anomotaenia ciliata*, *Dicranotaenia coronula*, *Diorchis stefański*, *D. nyrocae*, *D. ransomi*, *D. inflata*, *D. brevis*, *Aploparaksis furcigera* and *Trichocephaloïdes megalcephala* the effect of crowding was reflected by retardation of growth and arrested development. The following were found to belong to the group of tapeworms, which reacted to overcrowding only by retardation of growth: *Hymenolepis spiralibursata*, *H. paracompressa*, *H. parvula*, *H. gracilis*, *H. paramicrosoma* and *H. abortiva*. It was found that the number of mature tapeworms did not depend on the number of species present in the same host. The author suggests that the structure of parasite populations depends on the host-parasite inter-relationship and not on the struggle for existence between the parasites.

N. Jones

392—YANAI, T., 1959. [Department of Parasitology, Research Institute for Microbial Diseases, Osaka University, Japan.] [Studies on the behaviour and fate of various ascarid eggs placed outside the intestine of the host. 1. Experiment with eggs placed in the abdominal cavity of mice.] **Japanese Journal of Parasitology**, 8 (2), 294-311. [In Japanese: English summary p. 308.]

Unembryonated eggs of *Ascaris lumbricoides*, *Toxocara canis* and *Parascaris equorum* did not develop further than the morula stage when inoculated into experimental mice in organs other than the intestine. Auto-infection was thus not considered to be possible outside the intestine. M. Yoshida

Ecology

See also Nos.: 32, 174, 231, 238, 239, 240, 241, 242, 243, 248, 336, 337, 340, 352, 358, 425, 426.

393—BEKLEMISHEV, V. N., 1959. [Institut malyarii, meditsinskoi parazitologii i gelminologii Ministerstva zdravookhraneniya SSSR (Moskva).] [Populations and micropopulations of parasites and other associated organisms.] **Zoologicheski Zhurnal**, 38 (8), 1128-1137. [In Russian: English summary pp. 1136-1137.]

Beklemishev, discussing the different types of micropopulations that are found in various microhabitats (e.g. carcasses, faeces, nests), mentions ascarids, *Taenia* and *Ancylostoma* in the intestine of man as examples of "hemipopulations". It is explained that a "hemipopulation" is that micropopulation which occurs within a single microhabitat in the case of forms in which the life-cycle involves two or more different microhabitats. N. Jones

394—BELLE, E. A., 1959. [Trinidad Regional Virus Laboratory, Port of Spain, Trinidad, B.W.I.] "The effect of microenvironment on the free-living stages of *Bunostomum trigonocephalum*." **Canadian Journal of Zoology**, 37 (3), 289-298.

Belle studied the development of eggs and larvae of *Bunostomum trigonocephalum* at various temperatures and humidities. Eggs did not develop at temperatures below 15°C. or above 35°C., and were killed when frozen or exposed to temperatures of 40°C. Hatching occurred within 36 hours at temperatures above 25°C. The eggs did not withstand drying but could develop when the relative humidity was more than 80%. Infective larvae lived for several months in water at temperatures between 10°C. and 20°C., but died within 15 days at 0°C. The author concluded that the resistance of the infective larvae to desiccation was dependent upon the rate of drying and upon the temperature. H. D. Crofton

395—BOEV, S. N., 1959. [Institute of Zoology, Academy of Science of Kazakh S.S.R.] "Adaptation of lung nematodes of Artiodactyla and Perissodactyla in Kazakhstan to hosts and environment." **International Congress of Zoology** (15th) London, July 16-23, 1958. Proceedings, pp. 931-933.

Attempts have been made to correlate the endemic areas for various lung nematodes in Kazakhstan with the environmental conditions prevailing in these regions. The adaptations for both the definitive and intermediate hosts are illustrated. For instance, *Metastrengylus* spp. occur in damp regions because dispersal is dependent upon the distribution of earthworms. The distribution of *Dictyocaulus filaria* and *D. cameli* is wide owing to their adaptation to various terrains, while *D. viviparus* is not to be found in deserts and dry steppes and *D. eckerti* is adapted to mountain woodlands. Protostrongylidae are common in mountains and foothills where there is a plentiful quantitative and qualitative fauna of land molluscs. *Protostrongylus kochi* is most widely adapted to the definitive host and *Muellerius capillaris* to the intermediate host. K. Heath

396—DULKIN, A. L., 1959. [Uralski gosudarstvennyi universitet (Sverdlovsk).] [Observations on the movement of *Galba truncatula* Müller on pasture.] **Zoologicheski Zhurnal**, 38 (7), 1101-1102. [In Russian: English summary p. 1102.]

Dulkin has observed and drawn the movement of *Galba truncatula* placed in groups of three into puddles measuring 5-7 cm. \times 80-90 cm. The movement of the snails was discontinuous and the speed uneven. During a six-hour observation period they did not move more than 30-40 cm. from the starting point, and the longest path covered was 107 cm. The average speed was 0.61 cm. per minute in water and 0.103 cm. per minute on exposed sections of the bottom. G. I. Pozniak

397—GIBBS, H. C. & GIBBS, K. E., 1959. [Animal Pathology Division, Montreal Area Branch Laboratory, Macdonald College P.O., Quebec.] "The effects of temperature on the development of the free-living stages of *Dochmooides stenocephala* (Railliet, 1884) (Ancylostomidae: Nematoda)." *Canadian Journal of Zoology*, 37 (3), 247-257.

Gibbs & Gibbs studied the effects of temperature on the development of the free-living stages of *Uncinaria stenocephala* using agar cultures of *Escherichia coli*. They found that the minimum and maximum temperatures at which the ova would hatch and larvae develop to the infective stage were 7.5°C. and 27°C. respectively; that between these limits of temperature the time of development to the infective stage was inversely proportional to the temperature; and that ova hatched at 5°C. and at 37°C. but the larvae did not develop to the infective stage, the latter temperature being lethal in 77 hours. They concluded that the optimum temperature for the free-living stages was 20°C. They observed that the development of apparently full grown second-stage larvae held at low temperatures could be rapidly accelerated if the larvae were placed in a warmer environment.

C. Hatch

398—MARQUARDT, W. C., FRITTS, D. H., SENGER, C. M. & SEGHETTI, L., 1959. [Montana Veterinary Research Laboratory, Bozeman, Montana, U.S.A.] "The effect of weather on the development and survival of the free-living stages of *Nematodirus spathiger* (Nematoda: Trichostomylidae)." *Journal of Parasitology*, 45 (4), 431-439.

Marquardt *et al.* studied the effect of south-western Montana weather on the development and survival of *Nematodirus spathiger* of sheep. The average temperatures for this district were 24.9°F. for the period January-March, 50.4°F. for April-June, 62.1°F. for July-September, and 30.6°F. for October-December. They found that most rapid development of the ova took place from April to September; that development was slow and few embryos reached the infective stage from October to March; that infective larvae survived longest in the cooler seasons; and that at least 10% of the larvae could survive the winter whereas fewer than 1% of those set out in the open in June were recovered in July. They indicate that the largest numbers of infective larvae occur on pastures in the spring. The agents most detrimental to the free-living stages of *N. spathiger* are concluded to be sunlight and a high soil-surface temperature.

C. Hatch

399—NOBLE, E. R., 1959. [University of California, Santa Barbara College, Goleta, Calif, U.S.A.] "The ecology of parasitism." *International Congress of Zoology* (15th), London, July 16-23, 1958. Proceedings, pp. 654-656. [Discussion p. 657.]

Noble briefly reviews the ecological aspects of parasitism with particular reference to the pyramid of numbers, limiting environmental factors, competition and dominance, age and habits of the host, host isolation, factors affecting geographical distribution, and the relationship between the systematics and phylogenetic age of parasite and host. Most of the examples cited refer to parasitic helminths.

J. M. Watson

400—PAVLOV, P., 1958. [Institut d'Hygiène, Faculté de Zootechnie, Sofia.] "Recherches sur l'action du l'ensilage sur les formes nématodes (oeufs et larves) dans la période de sa conservation. Ière communication." *Ceskoslovenská Parasitologie*, 5 (2), 125-128.

Pavlov experimented with *Ascaris suum* eggs and with *Dictyocaulus filaria* third-stage larvae, which he put into silage, (consisting of lucerne, clover, mangels, maize and grass) during its preparation. *Ascaris* ova which were placed at the top in the decomposing layer became embryonated within 130 days. The eggs in mature silage did not develop. The author concludes that development of eggs depends especially on the presence or absence of oxygen. Embryonated eggs contained motile embryos 30 and 62 days after being ensilaged. Three months after being put into silage the embryos had retained their normal structure but were no longer motile. Three groups of three to nine experimental and one to two control white mice received respectively 60 to 120 ensilaged and normal embryonated *A. suum* eggs which had been stored, either in the silage or in the laboratory for three, four and five months. In the case of the eggs stored in silage the infections gave, in the first and second groups respectively, two and one positive result on the seventh day after infection. No positive results were obtained in the experimental mice of the third group. All control animals were infected. The intensity

of infection declined slightly with the time of storage. Third-stage *D. filaria* larvae were found to have granular structure and damaged sheaths 20 days after being put into the silage.

N. Jones

Pathogenesis

See also Nos.: 10, 16, 17, 18, 20, 28, 35, 41, 50, 51, 52, 54, 55, 58, 60, 68, 69, 70, 74, 75, 79, 80, 82, 85, 97, 99, 107, 131, 132, 133, 147, 151, 155, 162, 182, 187, 201, 203, 386, 416, 419, 426.

401—BABERO, B. B., 1959. [Department of Biology, Southern University, Baton Rouge, Louisiana, U.S.A.] "Pathology resulting from experimental infections by *Ascaris laevis* Leidy." *Transactions of the American Microscopical Society*, **78** (3), 330-335.

The histopathological changes observed in eleven species of rodents and other mammals due to experimental infections with *Ascaris laevis*, are described and figured. In the liver there were many retrograde changes, heavy leucocytic infiltration, and atrophy and necrosis of hepatic cells. Many necrotic areas contained third-stage larvae. The lungs showed evidences of pneumonia in some instances; larvae were not readily observed at any time of the infection. Lesions in the kidneys were slight and were possibly due to a toxic agent.

G. I. Pozniak

402—D'ABRERA, V. ST. E., 1959. [Department of Pathology, University of Malaya.] "Tropical eosinophilia. An aetio-pathological study. Part II." *Proceedings of the Alumni Association, Malaya*, **12** (2), 53-77.

D'Abraera gives details of seven cases of tropical eosinophilia (three adults and four children) which came to post-mortem examination. The pathological findings are discussed with reference both to the natural history of the condition and to the relationship with Loeffler's syndrome, ordinary bronchial asthma, periarteritis nodosa with lung involvement and eosinophil granuloma of the lung. A histological explanation is provided for the characteristic radiological mottling. D'Abraera considers that in this syndrome the cardinal features are due to involvement of the respiratory and haemopoietic systems. No single aetiological agent can be held responsible, the conditions being essentially a hypersensitivity reaction produced by a variety of migratory nematodes, the predominating species of which may be different in different countries.

J. M. Watson

403—MATSUMURA, T. & YUGAMI, S., 1959. [Department of Pediatrics, School of Medicine, Gunma University, Maebashi, Japan.] "Critical examination of the so-called *Ascaris* toxin from viewpoint of allergy. Preliminary report." *Gunma Journal of Medical Sciences*, **8** (1), 61-63. Matsumura & Yugami carried out experiments with *Ascaris* body fluid and culture medium containing *Ascaris* metabolites which have led them to believe that the alleged toxic effect of such extracts is actually an allergic phenomenon. No toxic or other pathological effects were produced in guinea-pigs bred for several generations under conditions which eliminated all possibility of *Ascaris* infection, whereas such effects were regularly produced in infected animals.

J. M. Watson

404—PFLUGFELDER, O. & EILERS, W., 1959. [Zoologischen Institut der Landwirtschaftlichen Hochschule Stuttgart.] "Auslösung von Adenomen in der Epidermis von *Rana temporaria* durch 'Filaria' rubella Rudolphi." *Zeitschrift für Parasitenkunde*, **19** (2), 101-110.

Pflugfelder & Eilers report that many *Rana temporaria* examined had adenomata which reached the size of a pea. On examination they were found to contain numerous "Filaria" rubella. Electron microscopy revealed no participation of virus in the formation of adenomata. Adenomatous formations were found to start partly from the stratum germinativum and partly from the so-called residual cells of the mucous glands. That the adenomatous cells were not precancerous was proved by the fact that they could not be converted into cancerous cells by the action of benzpyrene in agar implants. The paper is illustrated by nine photomicrographs.

N. Jones

405—SHIMIZU, K., 1957. [Department of Parasitology, Faculty of Medicine, Kyushu University, Fukuoka, Japan.] [An experimental study of gnathostomiasis. Report 1. The changes produced in the blood and in the liver function of rabbits given perorally the third stage larva of *Gnathostoma spinigerum*. Report 2. Sarle's phenomenon in gnathostomiasis.] *Igaku Kenkyu*, Fukuoka, 27 (8), 1733-1765. [In Japanese: English summary pp. 1762-1765.]

Rabbits which were either infected with the third-stage larvae of *Gnathostoma spinigerum* or received an injection of larval emulsion made up with 0.5% carbolic acid, showed pathological changes in the liver, the blood and the lymphoid system. These changes were considered to be caused by mechanical injuries due to larval movement within the host and, to a larger extent, by haemolytic substances produced by the worm. Sera from rabbits infected with second-stage larvae and from gnathostomiasis patients produced Sarles' reaction at the oral and, later, at the anal orifices of the worm. M. Yoshida

406—STEFĀŃSKI, W., 1959. [Laboratory of Parasitology, Veterinary Institute, Puławy, Warsaw, Poland.] "The role of helminths in the transmission of bacteria and viruses." *International Congress of Zoology* (15th), London, July 16-23, 1958. Proceedings, pp. 697-699. [Discussion p. 699.]

Stefāński reviews first the results of various workers on the introduction of bacterial and viral infection into the host through the skin by the agency of parasitic helminths, and then discusses the transmission of germs by intestinal helminths, with particular reference to injury to the mucosa. He concludes that helminths are more frequently responsible for the introduction of germs through the skin than through the mucosa; that various parasites behave differently as vectors for different germs; and that the explanation of the conflicting results obtained by experiment may depend upon the evolutionary relationships established between helminth parasites and germs coexisting in the same host. J. M. Watson

Immunity

See also Nos.: 27, 29, 30, 36, 69, 71, 77, 92, 137, 139, 140, 165, 167, 183, 186, 206, 224, 402, 403, 407, 426.

Abstracts of papers referring to the routine use of immunological techniques in diagnosis or assessment of cure will be found under the appropriate headings in the sections devoted to Medical Helminthology and Veterinary Helminthology.

407—AKAMATSU, T., 1959. [Department of Pathology, Osaka Medical College, Takatsuki, Osaka Prefecture, Japan.] [Experimental pathological studies on the allergy by the ascarid cavity fluid and its fractions. 1. On the attitude of skin reactions.] *Japanese Journal of Parasitology*, 8 (2), 253-277. [In Japanese: English summary pp. 274, 277.]

By using a cutaneous reaction as criterion, protein and polysaccharide fractions of *Ascaris suum* body fluid were shown to contain histotropic and serotropic antigens, respectively. M. Yoshida

408—BÉNEX, J., LAMY, L. & GLEDEL, J., 1959. [Institut Pasteur, Service de Parasitologie et Services de Vétérinaires de la Seine.] "Étude de la réaction de fixation du complément à l'antigène distomien chez le mouton." *Bulletin de la Société de Pathologie Exotique*, 52 (1), 83-87.

Bénex *et al.* investigated the value of the complement fixation reaction in the diagnosis of infection with *Fasciola hepatica* and *Dicrocoelium dendriticum*. Using sheep, both as experimental animals and controls, and a saline antigen prepared from the adult flukes, they carried out a series of tests which led them to conclude that a negative result reliably excludes a diagnosis of distomiasis, but that a positive result does not necessarily indicate that infection is present. No possibility exists of distinguishing between the two infections by this technique. J. M. Watson

409—KAGAN, I. G., 1958. "Hemagglutination tests with *Ascaris* antigens." *Journal of Immunology*, 80 (5), 396-399.

Kagan prepared antisera to human and pig strains of *Ascaris lumbricoides*, to *Toxocara canis* and *T. cati* by injecting whole worm antigens into rabbits. Antisera obtained by infection

with viable eggs showed a lower titre. The antisera cross-reacted with *Ascaris* and *Toxocara* antigens in haemagglutination tests but absorption with heterologous antigen produced generic specific antisera. Polysaccharide antigen obtained from human and pig *Ascaris* produced antisera which cross-reacted with antigens produced from these two worms. Absorption of these sera with homologous and heterologous antigen reduced the titres to 0. W. P. Rogers

410—KAGAN, I. G., JESKA, E. L. & GENTZKOW, C. J., 1958. "Serum-agar double diffusion studies with *Ascaris* antigens. II. Assay of whole worm and tissue antigen complexes." *Journal of Immunology*, 80 (5), 400-406.

By means of the agar double-diffusion technique, Kagan *et al.* compared whole worm antigens from *Ascaris lumbricoides* (pig strain) to purified polysaccharide-protein antigens from the same parasite. The material prepared by boiling whole worm material with 30% potassium hydroxide followed by precipitation with five volumes of 95% ethanol gave an antigen which showed one band. Polysaccharide-protein antigens prepared with ethanol, formamide, and acetone precipitation showed four to nine bands. Antigens prepared from different tissues of the adult worms and from unembryonated eggs by Fuller's formamide method were also studied.

W. P. Rogers

411—OKADA, K., 1959. [Department of Clinical Research, Institute for Infectious Disease, University of Tokyo, Japan.] [Fundamental studies on the anthelmintic effect on *Ascaris*. 2. Analysis by means of paper electrophoresis of the antigen and antibody of T.M. reaction.] *Japanese Journal of Parasitology*, 8 (2), 232-236. [In Japanese: English summary p. 236.]

The antigen of the T.M. reaction was shown to exist in the body-cavity fluid of pig *Ascaris* and in culture media as an excretory product. It was considered to be non-protein in nature because of its slight mobility on paper electrophoresis. The antibody of the T.M. reaction was found in the γ -globulin fraction of rabbit antiserum.

M. Yoshida

412—SCOTT, J. A., 1959. [University of Texas Medical Branch, Galveston, Texas.] "Growth and development of the filarial worms of cotton rats as related to immunity." *International Congress of Zoology* (15th), London, July 16-23, 1958. Proceedings, pp. 686-688. [Discussion pp. 688-689.] Scott discusses his own work and that of others on the growth and development of *Liromosoides carinii* in the tropical rat mite, *Ornithonyssus bacoti*, and in the cotton-rat, *Sigmodon hispidus*. The worms moult when they have reached a typical size. Very little increase of size occurs during the moult but between moults the worms grow at a fairly regular rate. The sclerotized buccal lining is valuable for identifying different morphological stages. Such characters have been useful in comparing the development of worms in immunized and normal cotton-rats and in susceptible and resistant hosts. Infective larvae can be induced to develop to maturity in naturally immune white rats by first introducing them subcutaneously into previously unexposed cotton-rats and then transferring them surgically to the abdominal cavity of the white rats. Experimental evidence indicates that the mechanism of immunity in immunized cotton-rats and naturally immune white rats is not the same.

J. M. Watson

413—SPREHN, C., 1958. [Celle, Deutsche Bundesrepublik.] "Die Parallelinfektion als wichtiger biotischer Faktor im Parasit-Wirt-Verhältnis bei den Helminthen." *Československá Parasitologie*, 5 (2), 173-179.

Sprehn discusses parallel infection with helminths as an important factor of parasite-host relationship. He regards such infections as one of the causes of disruption of the host's defence mechanism and of host-parasite equilibrium.

N. Jones

414—SUSUMI, S., KURAMOTO, T., ICHIHARA, TSUYOSHI & ICHIHARA, TSURUO, 1959. [The Chemo-Sero Therapeutic Research Institute, Kumamoto, Japan.] [Studies on the rapid flocculation test for fascioliasis. 2. Examination for various antigen emulsions.] *Japanese Journal of Parasitology*, 8 (1), 6-12. [In Japanese: English summary p. 12.]

For developing the reaction of the rapid flocculation test, cholesterin was found to be a better sensitizer than bentonite, kaolin, diatomite and talc, when lipid antigen was used. Both cholesterin and bentonite were ineffective for polysaccharide antigen. Emulsion was successfully stained by azur-II, malachite green and light green.

M. Yoshida

Anthelmintics

See also Nos.: 37, 41, 44, 50, 51, 56, 57, 62, 67, 72, 74, 76, 82, 83, 95, 96, 100, 101, 108, 112, 119, 123, 127, 138, 141, 143, 144, 149, 151, 153, 157, 158, 163, 166, 172, 175, 177, 180, 182, 191, 192, 200, 201, 204, 205, 210, 214, 215, 219, 378.

415—KNAPP, S. E., FOLSE, D. S., MOSER, H. C. & MFARLAND, R. H., 1959. [Kansas State University, Manhattan, Kansas, U.S.A.] "Comparative uptake of phenothiazine by *Ascaridia galli* and *Heterakis gallinae* in vitro." **Veterinary Medicine**, 54 (11), 536-538, xxxv.

Knapp *et al.* investigated the uptake of S^{35} -labelled phenothiazine, *in vitro*, by bird ascarids, in an effort to determine the reasons for varying effectiveness against different species. They found that *Heterakis gallinae* had an average uptake of phenothiazine nearly seven times as great as that of *Ascaridia galli*, although the body-weight of the latter was 120 times greater. In both species the males appeared to contain more phenothiazine than did the females. These findings may explain the high and low efficacy of the drug against *H. gallinae* and *A. galli* respectively.

J. M. Watson

416—LEE, R. P. & SHONEKAN, R. A. O., 1959. [Federal Department of Veterinary Research, Vom, Nigeria.] "Parenteral administration of anthelmintics." [Correspondence.] **Veterinary Record**, 71 (26), 537.

Lee & Shonekan conducted three critical anthelmintic tests with o,o-dimethyl-2,2,2-trichloro-1-hydroxymethyl phosphonate (Neguvon) [this formula should be o,o-dimethyl-2,2,2-trichloro-1-hydroxyethyl phosphonate] in 5% solution in water. They injected the drug subcutaneously in each of three animals (cattle) at the respective doses of 60 mg., 30 mg. and 20 mg. per kg. body-weight. The first two doses removed 97%-100% of *Bunostomum*, *Haemonchus* and *Oesophagostomum* burdens. High activity against *Cooperia* was obtained only at a dose level of 60 mg. per kg., which was followed by dyspnoea, inability to rise, muscular tremors, abdominal pain, diarrhoea, depression of the pupil and depression of the pulse rate. These side effects started one hour after treatment and persisted for four hours. Only one out of 15 cattle developed dyspnoea and passed soft faeces as a result of subcutaneous injection of 30 mg. of Neguvon per kg. body-weight.

N. Jones

417—MOSHKOVSKI, S. D., 1957. [Institut malyarii, meditsinskoi parazitologii i gelminologii Ministerstva zdravookhraneniya SSSR (Moskva).] [The development of chemotherapy of parasitic diseases in the U.S.S.R.] **Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow**, 26 (6), 650-657. [In Russian.]

418—NAGATY, H. F., RIFAAT, M. A. & MORSY, T. A., 1959. [Department of Parasitology, Abbassia Faculty of Medicine, Ein Shams University, Cairo, U.A.R.] "Trials of the effect on dog *Ascaris* in vivo produced by the latex of *Ficus carica* and *Papaya carica* growing in Cairo gardens." **Annals of Tropical Medicine and Parasitology**, 53 (2), 215-219.

Nagaty *et al.* investigated the anthelmintic effect of the latex of *Papaya carica* and *Ficus carica* trees growing in Cairo. They found that the *Papaya* latex had an ascaricidal effect in dogs at a dose of 1.3 ml. per kg. body-weight, while trials *in vitro* indicated that the lowest effective dose might be only one-tenth of this amount. The *Ficus* latex was less effective, a dose of 1.8 ml. per kg. being required to produce an ascaricidal effect. In the dosage used, the *Ficus* latex had no effect on dog cestodes.

J. M. Watson

419—SAIF, M., 1957. "Sudden shock due to treatment with Stibophen. A case report." **Journal of the Egyptian Medical Association**, 40 (12), 849-855. A case history is given of collapse and subsequent recovery of a patient after five injections of stibophen. Collapse occurred about one hour after the fifth injection was given and the condition of the patient rapidly deteriorated into one of severe shock. Prompt and thereafter almost continuous administration of oxygen over the first 12 hours proved to be the most important

factor in preventing complete respiratory and circulatory failure when accompanied by intravenous percorcen as supportive treatment. The use of intravenous hypertonic glucose or sedatives is not recommended. The reasons leading to these not infrequent instances of collapse after treatment with stibophen are not understood and require further study. O. D. Standen

Economic Aspects

420—ROBERTS, E. J., 1959. [University College of North Wales, Bangor, Wales.] "Problems of Welsh agriculture." *Agriculture. London*, **66** (4/5), 166-170.

Roberts points out *inter alia* that the proportion of loss to farming income from liver-fluke infection of sheep and cattle and associated necrotic hepatitis (black disease) is higher in parts of Wales than anywhere else in the United Kingdom. Flukes can kill ewes before the parasites are sufficiently mature to be harmed by any treatment known today. Pastures may remain infective not only for two or three summer months but also all winter as well. J. M. Watson

421—ROWLANDS, W. T., 1959. [Veterinary Investigation Officer, Bangor, Wales.] "Liver fluke in Wales." *Agriculture. London*, **66** (4/5), 170-173.

Rowlands details statistics showing the extent of the losses, particularly of sheep and, to a less extent, of cattle, suffered by Welsh farmers owing to fluke infection and associated black disease. These losses can be avoided by strategic grazing and dosing programmes. He points out that the disease is often wide-spread, although not clinically evident, in cattle. Pastures grazed by cattle are therefore potentially dangerous to sheep, a fact which should be taken into account in any scheme for control by pasture management as also should be the fact that hill grazings are not immune from snail infestation. The relationship between climatic conditions and fluke infection [for abstract see Helm. Abs., 27, No. 78a] is discussed and it is advocated that suspected snail habitats should be fenced off and strategic application of a molluscicide be made following any two consecutive wet months between May and October, and in August even in a dry summer. Ewes and cattle should be dosed in May or June. Ewes should be dosed from October onwards at periods of three weeks to within a month or so of lambing, while cattle should be dosed twice during this period, once in November and again in February. Hill and mountain sheep should be dosed before going up on to the high pastures and also given the routine winter dosing.

J. M. Watson

History

See also No. 154.

422—KAMALOV, N. G., 1957. [Kafedra epidemiologii Tbilisskogo instituta usovershenstvovaniya vrachei.] [Study of ancylostomiasis in Georgia.] *Meditinskaya Parazitologiya i Parazitarnie Bolezni. Moscow*, **26** (6), 691-695. [In Russian: English summary p. 695.] Kamalov, using data from the literature, gives an historical account of the study of occurrence and control of hookworm infections of man in the Georgian S.S.R. He concludes that these helminths have originally come to Georgia from Asia and Africa rather than Europe.

G. I. Pozniak

Biography

423—KOBULEJ, T., 1958. [Vysoká škola veterinární, Budapešt.] "Professor Sándor Kotlán sedmdesátiny." *Československá Parasitologie*, **5** (2), 5-7. Kobulej gives a short biography of Professor Sándor Kotlán on the occasion of his 70th birthday. A distinguished veterinarian, Professor Sándor Kotlán is best known to helminthologists for his work on the life-cycles of *Hyostrongylus rubidus*, *Oesophagostomum dentatum*, *Prosthogonimus pellucidus*, *Ollulanus tricuspis* and of *Strongyloides* spp. N. Jones

Evolution

See also Nos.: 307, 324, 357, 399, 406.

424—CHABAUD, A. G., 1959. [Institut de Parasitologie, Université de Paris, Faculté de Médecine, Paris VI^e.] "Remarques sur l'évolution et la taxonomie chez les nématodes parasites de vertébrés." **International Congress of Zoology** (15th), London, July 16–23, 1958. Proceedings, pp. 679–682. [Discussion p. 683.]

After considering the phylogenetic classification of the order Spirurida given by Chitwood & Wehr (1934)—based largely on the structure of the head—Chabaud draws attention to the value of the form of the head in the third-stage larvae of some highly modified species in throwing light on their systematic relationships. In many cases the head of the third-stage larva resembles that of the more primitive genera. He stresses the fact that any phylogeny demonstrated is that of greater adaptation to parasitism and does not necessarily imply a chronology. Thus a form recently adapted to parasitism is "primitive" in this sense and also it is impossible to know if a morphologically primitive species is an archaic or a recent parasite. He concludes that as a result there need not necessarily be a correlation between the phylogeny of the parasites and the classification of the host.

W. G. Inglis

425—PAVLOVSKI, E. N., 1959. [Zoological Institute of the Academy of Sciences of U.S.S.R.] "Some modes of evolution of infectious and parasitic diseases with natural foci." **International Congress of Zoology** (15th), London, July 16–23, 1958. Proceedings, pp. 30–35.

Pavlovski considers some aspects of his well-known theory of natural foci of disease in relation to the evolution of hosts and parasites. He lays stress, *inter alia*, on the establishment, during the course of adaptive evolution, of the mutual relations between the pathogen, its vector, the animal-reservoir of infection, and the recipient host, and between this biocoenosis and the external environment; on the evolutionary transformation of zoonoses into anthropozoonoses; on the extension of transmissible diseases from natural foci to human settlements; on the importance, for the successful investigation of natural foci of disease, of the competent application of both ecological and parasitological methods to the investigation of their geographical background and terrain (landscape epidemiology) by teams of bacteriologists, virologists, parasitologists, epidemiologists and clinicians; and upon the fact that the most effective measure of control is the eradication of elementary natural foci of diseases in dangerous localities. Some of the examples cited are helminthological.

J. M. Watson

Miscellaneous

426—GREGORY, T. S., 1959. [Division of Animal Health & Production, C.S.I.R.O., Animal Health Research Laboratory, Parkville, N.2., Victoria, Australia.] "The importance of ova of invertebrate and vertebrate animals in relation to animal health and production." **Australian Journal of Science**, 21 (6a), 170–178.

After discussing the production of hens' eggs for food supplies and their use in bacteriological and virological procedures, Gregory turns to quantitative aspects of the production of ova in poultry, sheep and parasites, mentioning *inter alia* the fecundity of *Haemonchus contortus*. There follows a section on the importance of ova in relation to helminth infections in which faecal egg counts in relation to worm burden and factors which may affect oviposition are discussed. Among other illustrations of the resistance of ova to adverse conditions are mentioned those of *Taenia saginata* and *Neoascaris vitulorum*. The transmission of antibodies through the eggs of birds is next reviewed; and the author concludes with a discussion of the role of ova in the transmission of disease, in which the helminthological examples are the transmission of *Histomonas meleagridis* by the ova of *Heterakis gallinae* and that of the virus of swine influenza by the ova of lungworms.

J. M. Watson

427—HOVORKA, J., 1958. [Helminthologisches Institut der Slowakischen Akademie der Wissenschaften, Košice.] "Bisherige Resultate und weitere Perspektiven der veterinären Parasitologie in der Tschechoslowakei." **Československá Parasitologie**, 5 (2), 27–36.

Hovorka discusses existing achievements and further perspectives of Czechoslovakian parasitology.

N. Jones

428—WHITLOCK, J. H., 1959. [Department of Pathology & Bacteriology, New York State Veterinary College, Cornell University, Ithaca, New York.] "Problems of nomenclature in parasitic diseases." *Journal of the American Veterinary Medical Association*, 134 (6), 291-292.

Whitlock discusses usage in relation to suffixes in different disciplines and traces its historical development. He stresses the importance of uniformity in nomenclature and repeats his earlier proposal that there should be uniformity in the terminology of diseases named for the biological cause. Thus he claims that the suffix *-osis* should be used for cases of parasitic disease; *-iasis* for the asymptomatic, relatively lesionless, carrier state; and *-ism* for both states indifferently or collectively. According to Whitlock, the primary diseases caused by helminths (cysticercosis, haemonchosis, trichinosis, and so forth) traditionally carry the *-osis* termination while those cases where the pathogenic status of the parasite is in some doubt often carry the *-iasis* suffix (e.g. taeniasis, gongylonemiasis), and the continued use of the suffix *-iasis* is almost entirely in the field of parasitology. [ANNOTATION—*Helminthological Abstracts* endeavours to combine common usage with correct etymology in the use of technical terms. In the present case no conflict arises. The termination *-iasis* is not only common usage in the nomenclature of helminth infections but also there is no ground, either in etymology or ancient practice, for the proposed distinctions. Exceptions are made in the cases of "strongylosis", which is used rather than "strongylasis" in order to avoid any possible confusion with "strongyloidiasis"; and of "hydatidosis" and "echinococcosis", on the grounds of general acceptance.]

J. M. Watson

JAPANESE JOURNAL OF PARASITOLOGY

Volume 8, Supplement, April 1959

This supplement contains titles, in Japanese, of papers read at the 28th Annual Meeting of the Japanese Society of Parasitologists, held in Tokyo on 6th and 7th April, 1959. Translated titles, without page numbers, of 163 papers of helminthological interest are available in the Commonwealth Bureau of Helminthology.

NEWS AND NOTES

W.H.O. Scientific Group on Bilharziasis (Chemotherapy)

THE GROUP met in Geneva, 19-24 October, 1959 to discuss the present status of bilharziasis chemotherapy and to make a report and recommendations to the Director General on research to promote the development of new chemotherapeutic agents. The Group comprised: Professor E. Bueding (U.S.A.), Dr. M. Gelfand (S. Rhodesia), Dr. R. Gonnert (Germany), Professor B. Maegraith (U.K., Chairman), Professor J. Schneider (France, Rapporteur), Professor R. da Silva (Brazil), Dr. O. D. Standen (U.K., Rapporteur), Dr. P. Thompson (U.S.A.).

Grant to Helminthological Society of India

IN THE ANNUAL REPORT of the National Institute of Sciences for India for the year ending 31st March, 1959, it is announced that a publication grant of Rs.500 was made to the Helminthological Society of India during the year.

Course in Medical Malacology

A COURSE designed to acquaint physicians and public health workers with the molluscs of public health importance has been introduced by the Department of Tropical Public Health, Harvard School of Public Health, under the direction of Dr. Edward H. Michelson. The course introduces the student to the field and laboratory techniques necessary for an understanding of the taxonomy, morphology, cultivation, ecology and control of molluscs which act as active or passive agents for the dispersal of pathogens, toxins or parasites productive of disease in man. Special students of suitable qualifications may enrol in addition to full-time students in the School.

This course has developed in connection with the broad research programme on the biology and control of the molluscan vectors of schistosomiasis being carried out in the Department; and is presented in recognition of the increasing world importance of schistosomiasis as a public health problem.

Bilharzia Control in Puerto Rico

THE PUERTO RICAN COMMITTEE for Bilharzia Control, consisting of one representative each from eighteen selected private companies and Federal and Insular Government agencies, was recently formed to advise the Secretary of Health of the Commonwealth of Puerto Rico. At the first meeting, held in July, presentations of the Isaac González-Martínez Award were made to Cdr. Leo A. Jachowski, Jr., Dr. José Oliver González and Dr. Juan A. Pons, for distinguished service in combating bilharzia.

Società Italiana di Parassitologia

THE YEAR 1959 saw the birth of the Italian Society of Parasitology, following a meeting in Rome at which were present numerous specialists

in this subject. The aims of the Society were defined as the union of those interested in parasitology; the stimulation of interest in parasitological problems and the promotion of their study; the organization of meetings and congresses; and the arrangement of cultural exchange between Italian institutions and bodies with similar interests in other countries. A provisional Committee of Direction was appointed, representative of the different branches of parasitology. The provisional centre of the Society's activities is: Istituto di Parassitologia, Città Universitaria, Roma.

Parassitologia

THE FIRST NUMBER of the new journal *Parassitologia*, which appeared in April, 1959, was predominantly helminthological in content. It included papers by A. G. Chabaud on regressive evolution of cephalic structures and classification in spiruroid nematodes, by E. Biocca on intestinal helminthiasis in Jewish communities in Iran, and by E. Biocca and L. Paggi on experimental infection of sheep with trichostrongyles of human origin from Iran; and research notes by M. Cortini and G. Ferretti on the use of agar-celluloid-paraffin in histological preparations of trematodes and cestodes, by G. C. Cagnolati and B. Merighi on the occurrence of *Trichinella spiralis* larvae in a fox captured in the Province of Rome, and by L. Paggi on the occurrence in central Italy of *Troglotyngolus* sp. as a lung parasite of Felidae.

Manuscripts containing accounts of original research may be submitted to the Director, Istituto di Parassitologia, Città Universitaria, Roma.

Trichinelliasis Conference in Warsaw

AN INTERNATIONAL CONFERENCE on Trichinellosis, to be held in Warsaw on the 12th and 13th of September, 1960, has been organized by the Polish Parasitological Society, to celebrate the 100th anniversary of Zenker's discovery. Delegates from all over the world are expected to participate. Contributions and announcements of intention to participate in the Conference should be addressed to the Organizational Committee, Institute of Parasitology, Polish Academy of Sciences, Warsaw, Pasteura 3, Poland.

Onchocerciasis in Africa

ACCORDING to a recent issue of *World Health* (November/December, 1959) about 90 million people are afflicted with onchocerciasis in tropical Africa.

Liberian Institute Needs Helminthologist

THE LIBERIAN INSTITUTE is seeking a helminthologist experienced in schistosomiasis work. Further particulars can be obtained from the American Foundation for Tropical Medicine, 551, Fifth Avenue, New York 17, N.Y., U.S.A.

Fiftieth Anniversary. Helminthological Society of Washington

THE FIFTIETH ANNIVERSARY of the Helminthological Society of Washington falls on October 8th, 1960. The society plans to observe the occasion

by holding a special all-day meeting, followed by a banquet, and to issue a commemorative number of the Proceedings. Members are urged to make plans now to attend this special meeting and banquet. A letter giving details will be sent to members.

OBITUARY

Dr. Daniel Owen Morgan

DR. DANIEL OWEN MORGAN, M.A., Ph.D., M.Sc., F.R.S.E., of St. Catherine's College, Cambridge, University Lecturer in Animal Pathology since 1952, died in Cambridge on Tuesday, November the 17th, 1959.

Born on August the 19th, 1893, Dr. Morgan received his early education at Tregaron County School. During the First World War he served as a signaller, losing the sight of one eye. Subsequently he read zoology and agriculture at the University College of Wales, Aberystwyth, where he began the specialization in helminthology which was to be his life-long interest. In his early post-graduate years he conducted researches under the guidance of Professor R. T. Leiper, C.M.G., F.R.S., at the London School of Hygiene and Tropical Medicine. In 1933 he was appointed Senior Lecturer in Zoology in the University of Edinburgh, where he was responsible for the teaching of helminthology not only to M.R.C.V.S. and B.Sc. students at the Royal (Dick) Veterinary College but also to post-graduate students for the D.T.V.M., D.T.M. and D.P.H., diplomas. He moved to Cambridge in 1952 to teach parasitology at the School of Veterinary Medicine.

His early work included studies on the bionomics of the potato eelworm, *Heterodera rostochiensis*, and on the helminth parasites of domestic animals of Hertfordshire. Later he made classical investigations into the helminth population of Scottish hill sheep. Much of his work was unique in that it established facts which opened up new fields of investigation. Perhaps his most important discovery was that of the "Spring rise" in the discharge of helminth eggs in the faeces of sheep at pasture. J. M. Watson

Alice Walton, M.B.E.

MISS ALICE WALTON was a member of the staff of the Commonwealth Bureau of Helminthology from its foundation, as the Imperial Bureau of Agricultural Parasitology in 1929, until her death on 4th December 1959. For over 30 years she was largely responsible for the technical preparation for the press of the Bureau's publications: Bibliography of Helminthology, Helminthological Abstracts and Technical Communications. Her earlier business training proved invaluable especially during the Bureau's formative years when she had charge of the sale of its publications, and in dealing with its finances which she handled with expert care until within a few months of her death. Her retentive memory enabled her to compile expeditiously special bibliographies for individual research workers in the Commonwealth.

At all times she willingly undertook extra duties on behalf of other members of the staff absent on sick leave or vacation and was ever ready to lend a hand in any emergency.

Her distinguished services were deservedly recognized in 1956 when she was awarded the M.B.E.

Both within the Bureau and in her private life Alice Walton was a woman of the highest integrity. Her kindly and generous nature, ready wit and tremendous sense of humour endeared her to many of the Bureau's overseas visitors with whom she subsequently maintained a lively personal correspondence and by whom, as by her former colleagues, she will be greatly missed.

R. T. Leiper

REPORTS OF MEETINGS

American Society of Parasitologists

THE THIRTY-FOURTH ANNUAL MEETING OF THE SOCIETY was held from 30th August to 2nd September, 1959, inclusive, at State College, Pennsylvania. Among the 152 papers read were 110 dealing with various aspects of helminthology. Brief notices of these papers will be found in the abstract section of this and following numbers of *Helminthological Abstracts*.

The presidential address entitled "Parasitological Speculations and Patterns" was delivered by Dr. Aurel O. Foster of the Beltsville Parasitological Laboratory, Animal Disease and Parasite Division, Agricultural Research Service, United States Department of Agriculture.

The programme and abstracts of the meeting form section 2 of number 4 of volume 45 of the *Journal of Parasitology*.

Academician Eugene N. Pavlovski was elected an Honorary Member of the Society and Professor Ernest C. Faust was elected Emeritus Member.

The first Henry Baldwin Ward Medal and Prize, sponsored by Parke Davis & Company for annual award in recognition of distinguished contributions in the broad field of parasitology, was presented to Dr. Clark P. Read.

The thirty-fifth annual meeting of the Society will be held in conjunction with the annual meeting of the American Society of Tropical Medicine and Hygiene in Los Angeles in 1960.

American Phytopathological Society

THE FIFTY-FIRST ANNUAL MEETING OF THE SOCIETY was held from August 31st to September 2nd 1959, inclusive, at University Park, Pennsylvania. Among other papers read were 21 dealing with various aspects of plant nematology.

The Annual Meeting of the British Association for the Advancement of Science

THE 1959 MEETING OF THE BRITISH ASSOCIATION was held from 2nd-9th September in York which, although a delightful centre in most ways, suffered from the disadvantage that many of those attending had to stay considerable distances away from the centre of activities.

The Inaugural Address was given by Sir James Gray under the title "The proper study of mankind is man" and this introduced one of the main themes which, with variations and extensions ran through many of the sessions of biological and associated sections—the problems following the rate of increase of human populations, especially in the so-called under-developed countries of the world.

Dr. Harrison Matthews, president of Section D, elaborated further on this in his presidential address and accentuated the dangers which face the human population. These are not only those of food shortages but also those resulting from the stress imposed by living under conditions of ever-increasing overcrowding. He also drew attention to the increasing exploitation of natural resources by man, with a complete lack of concern with the effect on local faunas which was leading rapidly to the extinction of many species of animals, and called for concerted and urgent action in the field of fauna conservation.

Amongst topics with possibly more direct implications for parasitologists, particularly for those with an interest in the evolution and speciation of the vectors and intermediate hosts, was the paper read by Dr. J. M. Thoday on "Divergence without Isolation". He described experiments with *Drosophila* which indicated that heterogeneity of habitat must be considered as a potential force tending to make populations polymorphic for differently adapted forms and that divergence without isolation is therefore a possibility and could add to the efficacy of subsequently imposed isolating factors.

One session was devoted entirely to parasitology under the chairmanship of Professor A. D. Hobson and took the form of a symposium on the evolution of host-parasite relationships. The symposium has been summarized in *Nature*, 184 (4689), 760-763.

In the section devoted to agriculture Mr. F. G. W. Jones outlined the present state of research in this country on plant-parasitic eelworms.

A number of excellent scientific films were shown and there was ample opportunity for informal discussions.

S. Willmott

The Institute of Biology

SYMPOSIUM ON "BIOLOGICAL PROBLEMS ARISING FROM THE CONTROL OF PESTS AND DISEASES" held in the Lecture Hall of the Royal Geographical Society, London, 1st and 2nd October, 1959.

Although in the twelve papers read little reference was made to helminth diseases, the problems under consideration were of general interest to helminthologists. Particular attention was paid to the development of drug-resistant races of parasites and to the economic and social consequences of successful control. These points were illustrated by Dr. Busvine in relation to the development of strains of agricultural insect pests and of disease-bearing insects resistant to various insecticides in use, and by

Dr. Barber in relation to bacteria resistant to antibiotics. Mr. Crawford pointed out that complete eradication of a major killing disease of livestock could lead to overpopulation with consequent harmful effects from overgrazing, malnutrition and soil erosion. This particularly applies to countries where livestock breeding is not strictly regulated and where social and religious taboos prevent slaughter of surplus stock. Disease control as a factor in overpopulation was also discussed in respect of man. Prof. Davey drew attention to the fact that possible adverse effects of efficient control of human disease in the tropics might be failure to acquire, or loss of, immunity to endemic infections. Later re-introduction of such infections might then take a virulent epidemic form. Questions and discussions followed the reading of each paper. A printed report of the Symposium will appear in 1960.

G. I. Pozniak

First All India Congress of Zoology

THE FIRST ALL-INDIA CONGRESS OF ZOOLOGY, sponsored by the Zoological Society of India, was held, under the auspices of the University of Jabalpur, from 24th to 29th October, 1959, at Jabalpur, under the presidency of Dr. M. L. Roonwal, President of the Zoological Society of India. An inaugural address was delivered by Professor Humayun Kabir, Minister for Scientific Research and Cultural Affairs. The chairman of Section 9 (Helminthology) was Dr. G. S. Thapar and the recorder was Dr. S. L. Jain. A number of helminthological papers were read.

PROGRAMMES AND PERSONNEL

Mr. A. Perera

REPRESENTING CEYLON, has been elected Chairman of the Executive Council of the Commonwealth Agricultural Bureaux, in succession to Dr. J. G. Malloch, M.B.E.

Mr. C. K. Reheem

REPRESENTING PAKISTAN, has succeeded Mr. Perera as Vice-Chairman of the Executive Council of the Commonwealth Agricultural Bureaux.

Recent Overseas Visitors to the Bureau

INCLUDED Professor Jean G. Baer, Director, Institute of Zoology, University of Neuchâtel; Dr. S. A. Sher of the Department of Plant Nematology, University of California, Riverside, California, U.S.A.; Mr. Minoru Ichinohe of the National Institute of Agricultural Sciences, Tokyo, Japan; Dr. D. L. Gunn, Director, Tea Research Institute, Talawakele, Ceylon; and Dr. A. G. Whitehead, East African Agriculture & Forestry Organization, Kikuyu, Kenya.

Dr. Owen D. Standen

PAID A ONE MONTH VISIT to the United States of America in the autumn of 1959 in the course of which he first delivered a paper on the mode of drug action of diphenoxyalkanes at the Gordon Conference on Medicinal Chemistry at Colby Junior College, New London, New Hampshire, and subsequently visited a number of laboratories and research institutions which specialize in helminthological work. Before returning to this country he attended the annual meeting of the American Society of Parasitologists and presented a paper dealing with inhibition of development of cercariae of *Schistosoma mansoni* following ultra-violet irradiation.

Dr. Alan G. Whitehead

NEMATOLOGIST, East African Agriculture & Forestry Research Organization, while working on the taxonomy of East African tylenches at the Natural History Museum, London, during a recent six months study leave, paid a visit to the Commonwealth Bureau of Helminthology. Among other matters discussed was the suggestion that a small organization should be established to prepare lists of workers on nematology in the tropics, and to facilitate exchange of information on programmes of work and unpublished results in this field. The idea of such an organization originated from informal discussions among delegates to the Fifth International Nematology Symposium in Uppsala during August, 1959. It was agreed that the Commonwealth Bureau of Helminthology would take over this work through the sections on "Personnel and Programmes" and "Movements of Helminthologists" in the reorganized *Helminthological Abstracts*, and possibly later through the annual issue of a *Register of Helminthologists*. Since the success of any such scheme depends on the co-operation of the interested parties, nematologists are requested, firstly, to fill in and return one of the questionnaire forms enclosed with this issue; secondly to notify the Editor of any change in their programmes or appointments; and thirdly, to inform him of any personnel movements which might be of interest to their fellows.

Dr. N. S. Ridley

PATHOLOGIST in the Hospital for Tropical Diseases, 4, St. Pancras Way, London, N.W.1, is interested in obtaining antigens for the schistosomal complement fixation test. Dr. Ridley has so far only obtained satisfactory results with antigens from naturally infected snail livers and

cercariae contaminated with snail faeces. He will welcome communications or samples from anyone willing to supply test antigens.

Mr. H. G. Willetts

PLANT PATHOLOGIST from the University of Bristol, has recently joined the Staff of the New England Experiment Farm at Glen Innes, New South Wales, and is at present engaged in research on nematodes attacking tobacco in the northern part of the State.

Academician E. N. Pavlovski

DIRECTOR of the Zoological Institute of the Leningrad Academy of Sciences, has been elected

an Honorary Member of the American Society of Parasitologists. A leading figure in Soviet parasitology, Professor Pavlovski, although best known for his studies on natural foci of parasitic diseases affecting man and domestic animals, has also published much strictly helminthological work including studies on plant-parasitic nematodes and on the ecophysiology of intestinal worms.

Walter J. Thames, Jr.

PLANT PATHOLOGIST from the University of Florida has been appointed Associate Professor of Nematology in the Department of Plant Physiology, A. & M. College of Texas, College Station.

MOVEMENTS OF HELMINTHOLOGISTS

HELMINTHOLOGISTS are invited to notify the Editor of any change of appointment or temporary movements from their normal station on leave or for other reasons, if such movements are likely to be of interest to their fellow helminthologists. At least three months advance notice is desirable.

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